

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXVII: No. 2.

New York, Thursday, January 13, 1881.

*\$4.50 a Year, Including Postage.
Single Copies, Ten Cents.*

The Steamer Anthracite and the Perkins High-Pressure System.

The great economy of fuel attained in modern marine and stationary engines, by the use of high pressures and compound engines, led to attempts to make another step in advance by using steam of much higher pressure than hitherto employed. The difficulties attending these efforts were great, and led to a series of modifications in the construction of the engines, &c., which are embodied in Mr. Loftus Perkins' system, which has been before the public for some time. Unfavorable circumstances prevented the gathering of any conclusive evidence as to the efficiency of the Perkins system during a trial trip made by the S. S. Wanderer, temporarily fitted with the engines. It was not until the Steamer Anthracite, built in Nov., 1878, was subjected to two rigorous tests that somewhat more definite information was brought forward. On the 23d of May, 1880, the Anthracite started from Erith via Falmouth for New York, where she arrived safely on July 2d, 1880, after touching St. Johns, N. F., on the 21st of June. She had a rough voyage, lasting 13 days. Her total length is 86 feet 4 inches her beam 16 feet and her depth 10 feet. Her gross tonnage is 70.26 tons, and her registered tonnage 29.91 tons. Before leaving England, a trial of the engines of the Anthracite were made by Mr. F. J. Bramwell, and when in this country they underwent a second trial conducted by officers of the United States Navy at Brooklyn. Both these reports are of much interest, and will be referred to at some length further on.

The main features of the Perkins high-pressure system may be briefly summed up as follows: Steam is generated in a boiler of special construction fed with distilled water, which is condensed and used over and over again, a small inevitable waste being made good by additional amounts of water, either carried along on board or distilled in a special apparatus. It is stated that during her trip across the Atlantic only 436 gallons of water were consumed. The necessity of preventing any contamination of the water condensed from the exhaust steam, called for the adoption of some means to avoid lubrication and for surface condensers. An obstacle which threatened to become insuperable was the cutting and scoring of the cylinders. This was overcome by the use of special devices for the valve arrangements, and by the employment of a compound anti-friction metal for the packing of glands, &c. The ordinary mode of packing the pistons was found unsatisfactory, and to overcome it a compound piston was devised.

The engines of the Anthracite (see Figs. 1 and 2) are of the direct-acting inverted type, with surface condensation. Two cylinders only are used, but the after cylinder has two diameters of bore; the upper ($7\frac{3}{4}$ inches in diameter) is the high pressure and receives the steam from the boiler during the first half of the down stroke; the lower, the larger diameter (15 13-16ths inches), is the medium or intermediate, and is supplied at the up-stroke with the steam, which in the high pressure did the work of the preceding down stroke. The stroke is 15 inches. The exhaust from the bottom of the after cylinder passes into a chamber, from which is afforded the supply to the low-pressure (the forward) cylinder (22 13-16ths inches in diameter). From this arrangement there is obtained in two cylinders an expansion of thirty-two times. The diameter of the piston rods (the areas of which must be deducted from the area of the intermediate piston, and from that of the under side of the low-pressure piston) is $2\frac{1}{2}$ inches.

The distribution of the steam in the after cylinder is made by three lifting double-beat valves, the upper faces of these valves being, however, divided into two sections. The valve stalks rise and fall by the action of eccentrics, which control the motion of the stalks downward as well as upward, the stalks being loose in close-topped sockets in the valves, so that after the valves are sealed the stalks can recede from them. The distribution of the steam to the low-pressure cylinder is made by an ordinary slide valve with an expansion valve on its back; this latter valve is worked off the prolongation upward of the circulating pump rod. The surface condenser is composed of a number

of close-topped, galvanized, wrought-iron tubes, standing vertically from a tube plate, and having within them smaller tubes open at both ends, and proceeding upward from a lower tube plate, so that the water from the sea passes up through the central tubes, and down the annular spaces to the inlet of the

diameter, is worked by a beam off the low-pressure piston rod, and the air pump, 11 1/2 inches diameter, is worked by a similar beam off the intermediate cylinder piston rod. The two feed pumps (2 inches diameter) and two bilge pumps (3 inches diameter) are worked off the crossheads of the circulating

having the space filled in with vegetable black. The water gauges, one in the boiler and one in the engine room, are made of flat plates of mica secured in frames. The boiler is supplied with distilled fresh water. There is a still fitted with a coil, and having its steam pipe in connection with the condenser.

reports presented of the two trials made, which cannot, unfortunately, at the present time, be supplemented by any accurate dates as to the record during the two trips of the yacht across the Atlantic and her excursions in American waters. Mr. F. J. Bramwell made a test of the engines during a run of 12 hours and 3 minutes, taking the time from the starting of the engines until they came to a stand, after 15 cwt. of "Nixon's navigation" lump coal and 5 pounds of wood had been consumed under the boiler. The throttle valve was put into the position which the engineer knew would cause the engines to run at 130 revolutions, and indicator diagrams (128 in all) were taken at intervals of half an hour.

The mean revolutions from 8.30 a. m. to 6.30 p. m., 10 hours, were 130.77 per minute, and from the first start to the same time being 11 hours 10 minutes, the mean revolutions were 130.4 per minute.

An experiment was made as to the transmission of heat through the boiler casing. This was carried out by placing the bulb of a thermometer in contact with the top of the casing, the bulb being covered over with cotton waste; the result was that at the end of one hour the thermometer stood at 125° F.

From the start at 7.20 a. m. to 6.30 p. m., 11 hours and 10 minutes, the engines developed an average gross indicated horsepower of 80.55, but from 6.30 to the time, 7.23 p. m., that the engines stopped of themselves from the fire having burnt itself out, the power was of course gradually diminishing. This being so, Mr. Bramwell has calculated the whole work from first to last in foot-pounds; these amount to 1,828,291,466 foot-pounds, equivalent to 923.38 horse-power if exerted for one hour. Therefore, the gross indicated horse-power developed during the trial being 923.38 horses, the consumption of fuel was equal to 1.83 pounds of coal per horse-power per hour, including the coal used in getting up steam. The loss of water for the whole 12 hours was 23½ gallons. Mr. Bramwell reports that the engines worked with "the most remarkable smoothness and regularity."

The report made by those conducting the experiments at the Brooklyn Navy Yard shows results differing considerably from those just cited. The Anthracite was fastened alongside and the engines were kept going for a period of 23 hours 58 minutes. The following are the figures obtained during this test:

Pounds of coal consumed per hour per indicated horse-power.....	2.7192
Total quantity of Cumberland semi-bituminous coal consumed.....	4400
Total pounds of refuse in ash and clinker.....	776
Total pounds of combustible consumed.....	3,624
Total pounds of feed water pumped into the boiler.....	35,114
Total double strokes of the pistons.....	148,154
Steam pressure in the boiler, in pounds, above the atmosphere.....	316.50
Throttle wide open.....	30.54
(In none of the cylinders was the steam cut down, nor was there steam or exhaust leak.)	
Vacuum in condenser, in inches of mercury.....	26.75
Back-pressure in condenser, in pounds, above zero.....	1.666
Temperature, in degrees Fahr., of feed water.....	120.5
Temperature, in degrees, of steam in the boiler at saturation.....	420.0
Pounds of coal consumed per square foot of grate.....	133.583
Pounds of coal consumed per hour per square foot of grate.....	13.987
Mean back-pressure against the piston of each cylinder, in pounds.....	4.21
Indicated horse-power of 1st cylinder.....	30,438
" " " " " " " " " " " " " " "	7,240
" " " " " " " " " " " " " " "	39,443
Aggregate indicated horse-power for all three cylinders.....	67,708
Total horse-power developed in three cylinders.....	80,135
Pounds of steam consumed per hour per indicated horse-power.....	21.61875
Pounds of steam condensed in the ist, ad and 3d cylinders, to furnish the heat transmitted into the total horse-power developed in the three cylinders, by the expanded steam alone.....	167,0730
Pounds of water vaporized from 212° by one pound of coal.....	9.8674

It will be noted that while Mr. Bramwell arrived at a fuel consumption per indicated horse power per hour of 1.83 pounds, Chief Engineers Loring, Ayers and Magee made it 2.7115. The economic results were therefore superior in the first trial by 36.88 per cent. to those of the second. This is partly due to the different quality of the coal used,

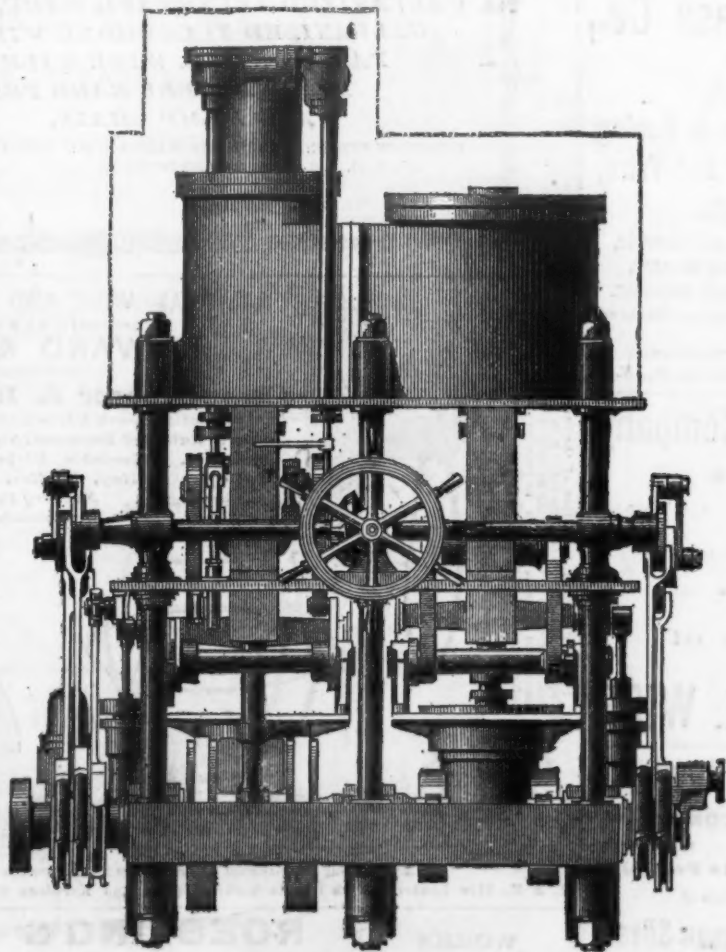


Fig. 1.—Front Elevation

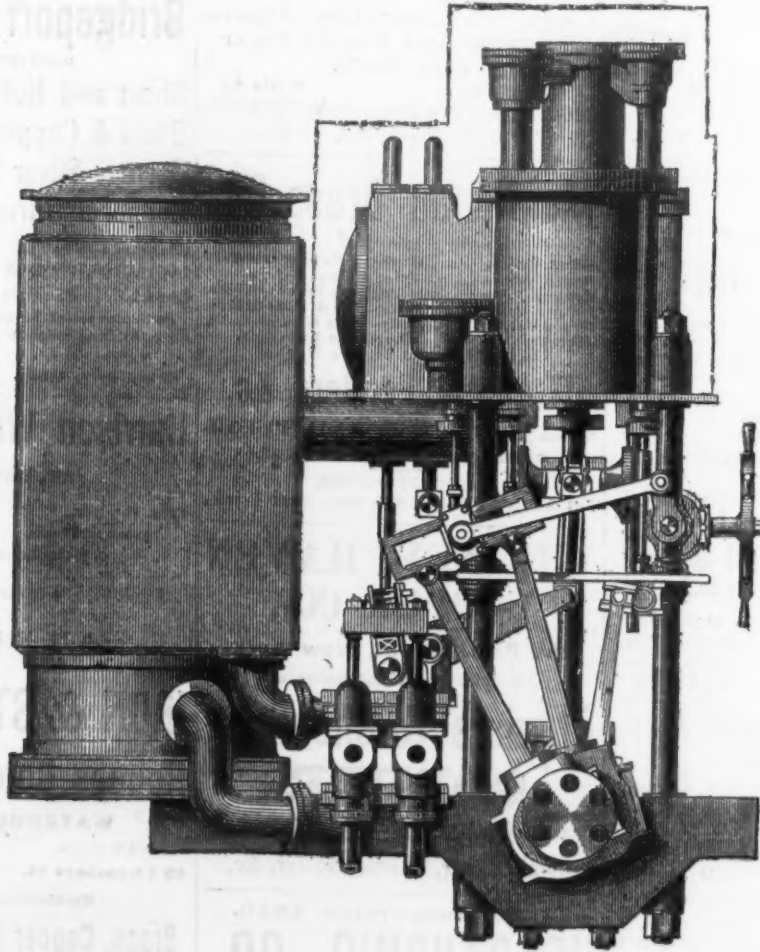


Fig. 2.—Side Elevation.

THE PERKINS ENGINES OF THE STEAMER ANTHRACITE.

circulating pump. It has a condensing surface of 422 square feet.

The exhaust steam is admitted into the body of the condenser, and comes into contact with the exterior of the close-topped tubes, the condensed steam being drawn off

pump and of the air pump. The reversal is effected by a link motion. The cylinders and their covers are heated by steam, circulating through wrought-iron pipes cast into the thickness of the metal, and are cleaded so as to prevent loss of heat.

by which the store of water can be distilled over for use. There are 14 sections in the boiler and seven rings in the fire-box. The length of the tubes above the fire is 4 feet 7 inches. The internal diameter of the tubes is $2\frac{1}{4}$ inches and the external diameter 3

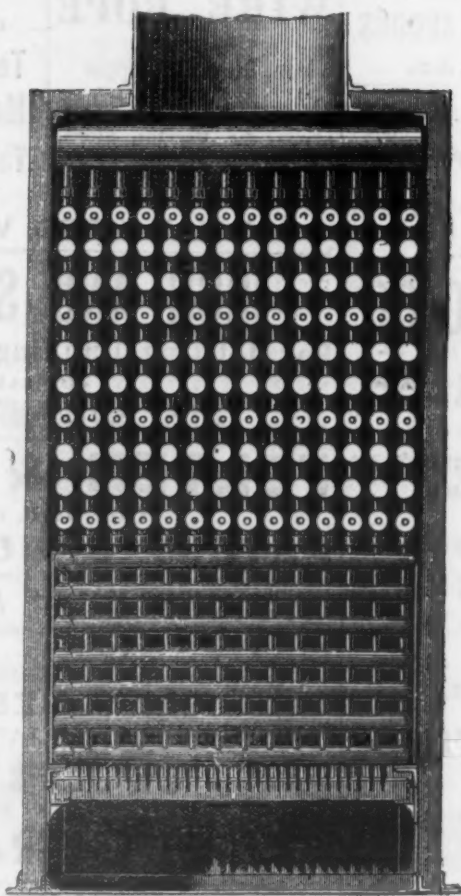


Fig. 3.—Cross Section.

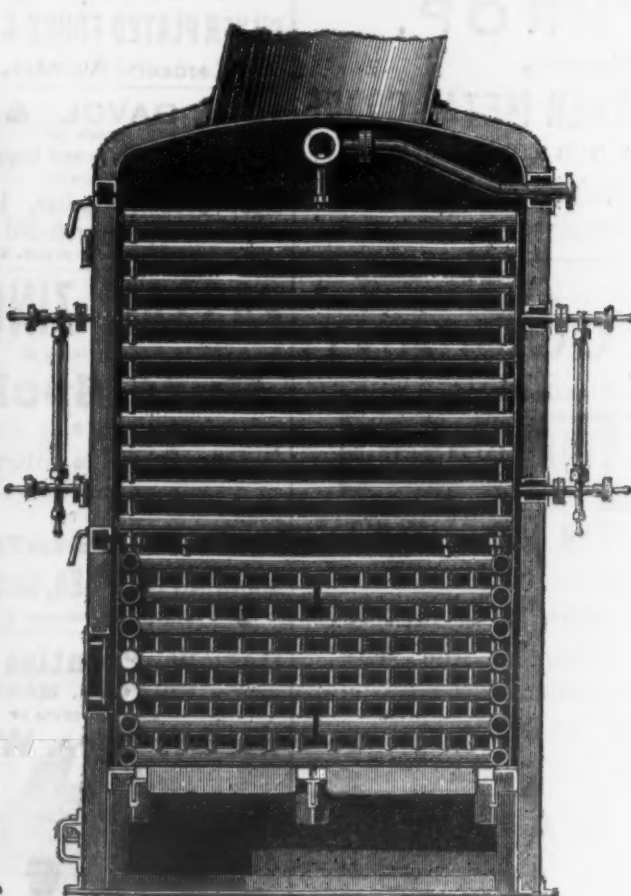


Fig. 4.—Longitudinal Section.

THE PERKINS BOILER OF THE STEAMER ANTHRACITE.

by the air pump, and returned to the hot well which surrounds the upper part of the condenser. The space between the high-pressure piston and the upper side of the intermediate piston is in connection with the chamber which supplies the low-pressure cylinder. The circulating pump, 11½ inches

The Perkins boiler (see Figs. 3 and 4) is formed of successive horizontal rows of wrought tubes, connected at frequent intervals by vertical thimbles. One end of each tube is secured in a wrought-iron plate, the other being welded up solid. The whole is contained in a wrought-iron double casing.

inches. The area of the fire-grate is 15 square feet and the total heating surface 633 square feet. The boiler pressure ranges from 400 to 500 pounds.

Such are briefly the main features of the engines and boiler of the Anthracite, and we may now proceed to a consideration of the

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the Nixon coal used by Mr. Bramwell having only 5 per cent. of loose white ash without clinker, while the Cumberland coal had 17.64 per cent. of refuse, most of which was clinker. Taking into account the ingenious effect incident to the removal of clinker, Messrs. Loring, Ayers and Magee find that Mr. Bramwell's results are superior to theirs by 18.35 per cent. Concerning this discrepancy between the two tests, they say: "The only manner in which this large difference can be accounted for is by supposing that in Mr. Bramwell's experiment the water level in the boiler was carried lower than in ours, and that the boiler steam was consequently more superheated. It is known that, when in the Anthracite's boiler the water level fell below a certain point, the steam became superheated to the degree of burning the packings in the stuffing boxes of the valve stems. In our experiment, the water was kept well above this level. Moreover, the difference between the boiler pressure and the initial pressure in the first cylinder was much greater during Mr. Bramwell's experiment than in ours, whereby the corresponding differences of temperature were greater in his. The differences of these temperatures in Mr. Bramwell's experiment was 45° F., and in ours 35 degrees, in which it follows that the superheating from this cause was greater in his experiment than in ours. This was owing to the greater throttling in his experiment. Further: the speed of the pistons was greater in his experiment than in ours; and when the pressures on the pistons are sensibly the same, as in the case of these experiments, this causes a decrease in some unknown ratio of the cylinder condensations. In Mr. Bramwell's experiment, the pistons made 130,388 double strokes per minute, and in ours 103,027 double strokes. The difference, as the piston pressures were nearly equal, was caused by the fact that Mr. Bramwell's experiment was made with the vessel in free route, while in ours the vessel was secured to the wharf.

"The belief that the steam was considerably more superheated in Mr. Bramwell's experiment than in ours, is sustained by a comparison of the cylinder condensations in the two cases. In our experiment, the steam condensed in the first cylinder was 56.22 per cent. of the total quantity evaporated in the boiler. In his experiment it was 34.99 per cent. In our experiment, the steam condensed in the second cylinder was 38.41 per cent. of the total quantity evaporated in the boiler. In his experiment it was 21.53 per cent. In our experiment, the steam condensed in the third cylinder was 10.05 per cent. of the total quantity evaporated in the boiler. In his experiment, it was 8.47 per cent."

Calculations made to ascertain whether these differences in the cylinder condensation would account for the difference in the heat cost of the powers respectively developed, showed that it was wholly due to that cause. An important feature in connection with the machinery of the Anthracite is that the difference between the boiler pressure and that in the high-pressure cylinder is so great. On the whole, though the results are fair, they are scarcely as good as might be expected from an engine working with so high a boiler pressure.

The engines of the Anthracite, however, possess some defects which are not inherent to the Perkins system. Principal among these is the inefficient method of steam jacketing the cylinders, entailing the excessive cylinder condensation noted. Furthermore, the clearances and steam passages of the cylinders are enormous, being from two to four times greater than necessary. This defect could be eliminated easily by a better design of mechanical details.

Blue Process Drawings.

To produce blue lines on a white ground necessitates a double printing, in the first instance. The first operation is to make a blue print, which should be on very thin paper and printed very dark and solidly. This print is then used instead of a tracing in making other copies. We have seen very fair work done by this method of operation, but have not been able to get satisfactory results from any experiments which we have tried. Mr. Albert Levy, of 4 Bond Street, New York, makes "blue" paper, and has, in addition, what he calls a "negative" paper. This is the same as that ordinarily used for copying drawings, except that the paper is quite thin. The first print is made on the thin paper, which is then washed and dried in the usual way. Here we may say that this paper needs a great deal of washing; half an hour, at least, should be given to it. When the negative is ready, it is used in the same way as an ordinary drawing and placed above a sheet of the ordinary blue paper. We have found that a very long exposure is necessary, in order to get even readable drawings. We fancy that the best results would be obtained by making the drawing on the blue paper itself. To do this we should take a piece of blue paper and expose it to bright sunlight till the color is well developed, and then wash and dry it in the usual manner. We would then make the drawing directly on the blue paper, and use for ink any of the liquids which bleach the blue color. Fortunately, there are almost numberless fluids which will do this. Common washing soda will do it as well as anything, and may be dissolved in water and used instead of ink. It may be also used to clean up any white line which is too faint.

Mr. Charles L. Moller, of 30 Cortlandt street, New York, is manufacturing a paper, 23 by 36, which we have found works very much better than any other we have tried. Its color is a light yellow, and it is quite sensitive to the action of light and easily washed. This paper, if kept excluded perfectly from the light, keeps remarkably well. We have had samples of it which would produce fair work after having been prepared six months, at least. The lines, however, after the paper has been copied so long, are likely to be a pale blue instead of a white, due to the fact that the paper has had more or less exposure to light.

We believe that, even with the ordinary paper, it is possible to make blue lines on a white ground if a little extra time is employed. The methods of operation are somewhat sim-

ple, yet it cannot be out of place to give here some directions in regard to the best methods of producing blue copies. A flat board should be provided as large as the tracing and drawing which is to be copied. On this board two or three thicknesses of common blanket or its equivalent could be laid. This is done in order to give a soft level and elastic backing for the paper on the blanket. The prepared paper is laid with its yellow or sensitive side uppermost on this paper. The tracing is placed and smoothed out as perfectly as possible, in order to secure a contact over the whole surface of the paper beneath. Upon the tracing a plate of clear glass is laid; preferably, this should be heavy enough to press the tracing down upon the paper. Ordinary plate glass, say three-eighths of an inch thick, is quite sufficient. Where this cannot be obtained, 26-ounce glass may be made to answer, if the drawing is not very large, putting weights upon the corners beyond the tracing. The next operation is to expose the whole to a clear sunlight, by pushing it out on a shelf from a window or in any other convenient manner. From 4 to 6 minutes is usually sufficient in the summer time. In the winter from 6 to 10 is necessary. If the drawing cannot be exposed to the sun, but only to the clear sky, the exposure must be continued from 20 to 30 minutes, and if the day is cloudy from 60 to 90 minutes will be needed. The color of the print depends upon the length of time it is exposed to the strength of the light. If the color is pale the exposure has been too short, while if the color is dark it has been too long. After having been exposed for the proper length of time, remove the prepared paper and wash it freely for one or two minutes in clear water. If a large dish is convenient the print may be laid in the water, and after being rinsed or water poured over its surface for a minute or so, may be allowed to soak for 10 or 15 minutes. It should then be hung up by one corner to drain and dry. While the print is wet it should be preserved from contact with anything which is likely to change the color, and, for this reason, it should not be laid down upon a black walnut board, or upon anything where it will come in contact with iron, which is likely to cause slight discolorations. The sheet of paper, if large, may be laid upon a clean pine board and washed by sprinkling it with water from a watering pot. It can then be hung up to dry. In any event, care should be taken to wash all trace of yellow solution off from the paper.

Mr. Moller sells a solution for use in making negative paper at \$2.50 per bottle. Each bottle would be sufficient for covering a roll of paper 30 yards long by 36 inches wide. In coating paper with the solution, which, by the way, should be protected from light, a sponge about 4 inches in diameter may be used, going over the paper the first time with sponge quite moist. The solution should be well rubbed into the paper. Going over the second time the sponge should be squeezed dry, and the solution spread over the paper evenly. The sheet should then be laid away to dry in the dark, and must be kept sheltered from the light until it is used. It may not be generally known that ordinary photographic negatives may be used and blue pictures obtained with this paper from them. With a very transparent negative a picture may be taken on blue paper exposed to direct sunlight in from one to two minutes, while darker negatives may require three or even five minutes. With this solution one can coat thinner kinds of paper, such as express cap or bond paper, and thus make what we have described as negative paper of varying grades. It is always better, in making a blue copy, to use a tracing, rather than a drawing, on thick paper, as the work then becomes sharp and is more quickly done.

Dangerous Toys.

We take the following from an English exchange:
A plentiful and cheap supply of toys will, it is generally considered, contribute to the happiness of children and the tranquillity of their parents. The recent action of the authorities in Paris suggests, however, that this result may not always be insured. A toy producing the symptoms of lead poisoning is not so conducive to the diversion of children and the peace of their parents as the Parisian itinerant vendor of these wares would have us believe. A number of boxes, loaded with toys, painted in brilliant colors, elastic balls colored and varnished, lead soldiers in every variety of uniform, have been seized by the French police. It has been proved that the color would easily come off, particularly if the children put the toys to their mouths—a habit which seems inherent in every child's nature. "These playthings," says the *Lancet*, "painted with poisonous colors, had been imported from Fürth, in Bavaria, and a committee of the manufacturers of that town has recently held a meeting on this subject. A circular was at once issued to all the toy manufacturers, urging them to use non-poisonous paints, and reminding them that according to the German law, they had exposed themselves to penalties—fines and imprisonment." The *Gesundheit*, of Frankfurt, remarks that but for the repressive measures adopted in Paris the German authorities would still neglect to enforce the German law. This apathy, according to the German papers, is all the more reprehensible as the Fürth manufacturers send their toys all over Germany, and may, therefore, poison the children of the Fatherland as well as the little Parisians—a consideration which, in the Teutonic mind, must greatly accentuate the gravity of the question. To us the matter is not less serious. It is well known that the majority—in fact, nearly all—of the cheap toys sold in England are imported from Germany, and we regret that it is to the Parisians rather than to the English authorities that we must attribute the honor of seizing these dangerous playthings. We trust that no time will be lost in following this excellent example, and that a more strict watch will be kept to prevent the importation from abroad of poison for the nursery.

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These shoes are made of superior iron, completely finished
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NORTH BROS.,
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Fine Light and Medium-Weight GRAY
IRON CASTINGS to order.
Correspondence solicited.

**Nason Mfg. Co.'s Improved Steam
Trap.**

In our issue of December 30 we published
an article upon steam traps, in which refer-
ence was made to the advantages of the pot
trap. An illustration was given showing
the old form of construction. This trap, in
the form which we illustrated it, was invented
years ago by Mr. Joseph Nason, of the
Nason Mfg. Co., 71 Fulton street, who, un-
fortunately for himself, neglected to take
out a patent for it. This form of trap,
shown in Fig. 3, while it had many impor-
tant advantages, had also a great many
points which rendered it inconvenient. The
valve opening, being at the bottom of the
"pot" or float, was constantly liable to be
clogged by dirt, chips and bits of red lead,
rubber and scales from the pipes. The lat-
ter, in fact, were constantly finding their
way into the pot, and causing trouble, which



Fig. 1.—Elevation of Trap.

was aggravated by the lead. The connec-
tions too were made in such a way that to
make repairs it was always necessary to
break one connection and take off the
whole top of the trap.

Fig. 1 shows an elevation of the improved
trap. In general form it is similar to the
old style, though it will be noticed that the
connections are all below the cover joint,
thus enabling the cover to be removed with-
out disturbing them. A smaller cover in
the center of the larger one gives access to
all the working parts. This is an additional
convenience, as the smaller joint is much
more easily made than the large one.

Fig. 2 shows a section of the trap in the
improved form, for which a patent has been
obtained. It will be noticed that the steam
or water enters upon the right. When it

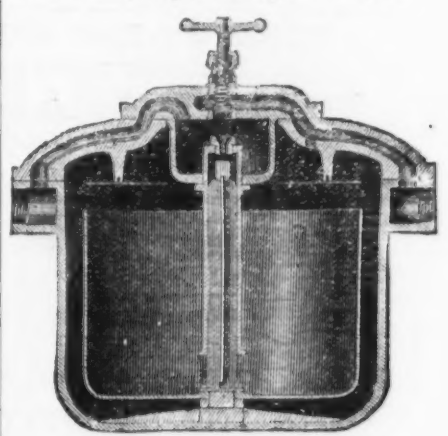


Fig. 2.—Section of Trap.

is desired to blow through, it is only neces-
sary to raise the valve by means of the
hand-wheel, and there is free communi-
cation between the coils and the air. When
this is closed, the water finds its way
into the body of the trap through an open-
ing shown in the casting. It drops at once
upon a diaphragm of sheet metal, which
prevents the float from filling before the body
of the trap is full. The water runs to the
outer edge of the plate and falls outside the
float.

The valve, instead of being located in the
bottom of the float or "pot," is placed above,
and the valve stem, which has four wings,
forms a guide for the pot as it rises and
falls. The stem works in a tube which ex-
tends nearly to the bottom of the pot. Its
mouth is always under water when the
trap is discharging. The valve seat, it will
be seen by inspection, is connected with the
small cover, so that the whole of the work-

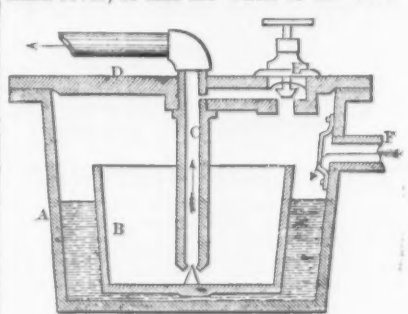


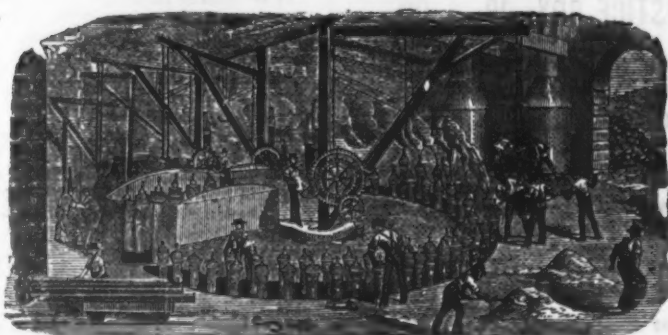
Fig. 3.—Section of First Form of Common Pot Trap.

ing parts, save the float itself, can be taken
out when the small cover is removed.

In this construction, the valve is out of the
way of dirt or the annoying red lead and
chips, and is easily accessible with no other
tools than a monkey wrench. All the ad-
vantages of the old style are retained. The
trap can be adjusted to any pressure by
enlarging or diminishing the size of the hole
in the plug which forms the valve seat.
This trap will drain upward, delivering the
water at any desired height to which the
steam pressure used is capable of lifting it.

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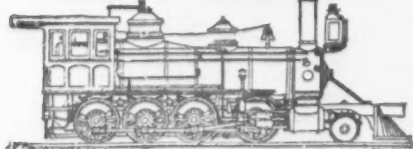
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Forgings for Piston Rods, Guide Bars, Wrist Pins and Machinery Purposes.

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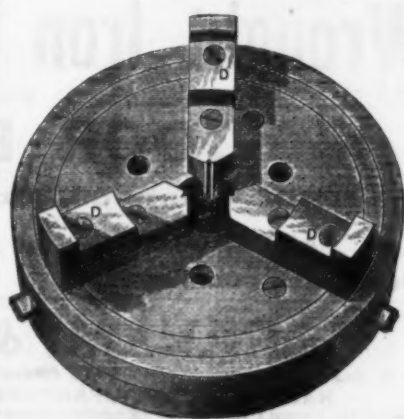
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Papers on Practical Founding.—XIII.

BY EDWARD KIRK.

PATTERNS.—(CONTINUED).

When a cast-iron pattern has been made from the wooden, clay, or sheet lead pattern, the work is only half done. It has yet to be finished before a casting can be made from it. The finishing of an iron pattern is just as important a matter as the making of it, and a great deal of skilled labor has yet to be expended upon it before it is properly a stove pattern.

After an iron pattern has been cast, the loose sand is brushed from it, and it is placed in a bath of sulphuric acid and water and allowed to remain a short time, until the removal of the hard scale of sand is effected. It is then taken from the bath and washed in clean water to remove the sulphuric acid; after which it is dried in the sun or by the heat of a stove, and filed or scraped to remove any roughness, and to give all the edges, ribs, lugs, &c., the proper draft. The drafting and finishing of the iron pattern is at least as important as that of the original wooden pattern, for there is only one mold to be made from the latter, and any little imperfection in the pattern can be remedied in the mold; but an iron pattern, from which thousands of molds are to be made, must be correct or there will be a great deal of time lost in mending the molds, and the castings will not be accurate. In order to save time and insure perfect castings, every part of the pattern must be made as smooth as glass, and every little projection or edge must be properly drafted. Not only must a pattern be finished so that it will mold properly, but it must be made to fit all the other patterns that go to make up the stove, so that the castings, when made, can be put together with very little filing or grinding. Any ordinary stove-mounter can scrape and draft a set of patterns so that they will mold properly, but none but an expert can fit up a set of stove patterns so that each casting will fit in its place in the stove, leaving the proper space for expansion when the stove is heated. There is no rule for the expansion of stove castings that will hold good in all cases, for cast iron expands more or less according to the degree of heat to which it is subjected, and there are scarcely two castings in a stove that are heated exactly alike. When the fire is started, some parts of the stove will be almost red hot before others are even warm. To become a first-class pattern fitter requires long experience and a practical knowledge of molding and stove mounting.

After a set of iron patterns has been filed or scraped perfectly smooth, and has been properly drafted and fitted in the stove, the patterns are wet with a little water and allowed to assume a thin coat of rust. They are then heated slightly, and, while warm, are covered with a thin coating of beeswax, which has been well heated and boiled to harden it. This is done to prevent further rusting of the pattern by the dampness of the sand and to give it a smooth surface. The beeswax is usually melted in a skillet or pot, and applied to the warm pattern with a small brush. After the pattern has cooled, the surplus wax is removed by scraping with a dull knife or a piece of hard wood. The pattern is then brushed and rubbed with a hard, stiff brush, until it is as bright and smooth as a looking-glass. Various pattern varnishes are used for finishing iron patterns, but none is superior to beeswax for giving a smooth surface to the pattern or for durability. Some of them, however, are more easily and quickly applied to the pattern, and are, therefore, employed, the patterns being varnished every few days when in use.

After the iron patterns have been beeswaxed or varnished and brushed and finished, the next thing to be done is to follow-board them for molding. Follow-boards for stove patterns are generally made of 1 1/2 inch pine lumber that has been well seasoned and is free from large knots. This lumber is cut into boards 6 inches wide and longer than the pattern to be laid upon it, and on the bottom of each board, 4 or 5 inches from the ends, two heavy battens are nailed or secured with screws, so as to hold it together and prevent it from being sprung or warped by the dampness in the foundry, and also to serve as supports for the board when it is laid upon the floor to run up the drag of the flask upon. The iron patterns are fitted on this board, so that they will be perfectly solid, and for any projections on the cope side, or the side of the pattern that is laid upon the board, the board is cut out and the pattern fitted into it in proper shape for molding, while for any projections that are upon the top, or face side, on the parting line of the pattern, the board is built up to the parting line by nailing small pieces upon it and beveling them off, from the parting line of the pattern to the surface of the board. Where the pattern is let down into the board, the latter is beveled to the parting line of the pattern and made to fit it, so that it will form a perfect parting on the sand around the pattern when the drag is rammed up.

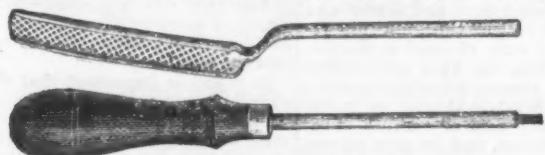
The proper arrangement of the pattern upon these boards, which are called follow-boards because they are built up or cut down, so as to follow every parting line of the pattern, is as important a matter as the making or fitting of the pattern, for the follow-board is designed to lay the pattern in the proper position in the sand, in the drag of the flask, when it is rammed up to form the parting between the cope and drag of the flask and to save time in removing the surplus sand and making a parting. If the pattern does not lie perfectly solid upon the follow-board and is not properly supported underneath where it does not touch the board, it will spring when the sand in the drag is being rammed, and when the the drag is rolled over and the follow-board

removed, the pattern will not lie solid in the sand. Now, the cope side of the mold cannot be made from a pattern that does not lie solid in the sand of the drag, for it will spring or rock, and the sand in the cope cannot be rammed solid upon a pattern that springs, so that it will lift from the pattern in the cope. When a pattern is not solid in the drag, it must be rapped or forced down into the sand until it lies perfectly solid, and this rapping down of the pattern forces down the high places in the sand and forms hard spots in the mold, which often spoil the casting, for molten iron will not lie upon the hard spots in a mold, but will boil and form blow-holes in the casting or scars upon the face of it. In order to make first-class work every pattern must be fitted solidly upon the follow-board. These should all be overhauled occasionally, for they will always warp and twist more or less however strongly they may be put together, and they also get worn out of shape by being struck with the point of the rammer, and by having the pattern carelessly laid upon them. In order to keep them in good working order, the patterns should be refitted to the boards occasionally, so that they will lie perfectly solid and prevent bad castings from being made, or the patterns from being broken by being rapped into the sand.

It is just as important that the patterns should be properly arranged upon the boards as it is that they should be solid. They must be arranged to give the proper amount of sand room between the patterns and the flask, and between the patterns when there are more than one pattern on the same board. The patterns must be arranged upon the boards so as to make the flask as small as possible and have as few follow-boards as may be. For large pieces, such as bottoms, hearths, backs, oven plates, &c., a follow-board is made for each piece, while two or more small pieces, such as small doors, covers, flue strips, &c., are put upon one board, and are so arranged as to make the board as small as possible and give the proper amount of sand room around each pattern. The sand room generally allowed between the pattern and the inside of the flask is 1 1/2 inches, and that allowed between the different patterns, when two or more are put upon the same board, varies according to the size, shape and weight. For light plain pieces, such as flue strips, 1 inch of sand room is sufficient; and for covers and like patterns where the principal part of the mold is formed in the cope, 1 1/2 or 2 inches of sand room is allowed. When a small piece is boarded with a large piece, as in the case of tops and sides, when a small piece is sometimes put on the board inside of the top or side pattern, from 2 to 6 inches of sand room is allowed. The object of this sand room between the patterns is to separate the mold formed in the sand by each pattern. When two molds are formed in the same flask, one is always poured before the other, and if there is not sufficient space between them the sand will be pushed out of place by the pressure of the molten iron, and the metal will flow through from one mold to the other, thus uniting them and destroying both. This distance between the patterns on the follow-board is also to prevent the castings from being strained and made too heavy, for when a mold is poured the molten iron always has an upward pressure upon the cope side and lifts it more or less. Moreover, the heat of the molten iron dries the sand very rapidly, and if there is not sufficient room between the molds, the sand will be dried and raised a little over the mold that has not been poured by the molten iron in the other, so that when the second mold is poured the casting will be strained and made too heavy and rough on the edges. To avoid this, the patterns are placed at a sufficient distance from each other on the follow-board, so that the sand of one mold will not be affected by the molten iron in the other; when two or more pieces are molded in one flask they are all poured as nearly as possible at the same time, and when a small piece is put in the center of a top or side, it is always placed at as great a distance as possible from the pattern that surrounds it, and is always poured before the large piece. In all cases the further apart the patterns are placed on the follow-board, and the more nearly the pieces in one flask are poured together, the smoother and more accurate will be the castings. The number of follow-boards required for a set of stove patterns varies according to the size of the stove and the fancy of the founder. Through the Eastern stove founding district the founders generally believe that the smaller the follow-boards and flasks are, the easier they are to handle, the more molds a molder can put up and the lighter and smoother the castings will be. They therefore make a separate follow-board for every piece of any size. For a number, eight or nine, separate boards are generally made for each oven plate, each oven door, each long center, each rack or oven shelf, and so on. It very seldom happens that more than four pieces as large as covers are put upon one board, so that all the follow-boards and flasks are small, and more are required. Through the Western stove founding district the founders generally believe that the larger the follow-boards and flasks are, the less the expense will be, and the more molds a molder can put up, because they have fewer follow-boards to handle and it takes no more time to put down a large follow-board and lay a large flask up than it does a small one; moreover, a molder does not require so many large flasks as he would small ones, and consequently he saves considerable time in handling flasks. Western founders, therefore, make all their follow-boards as large as they can be conveniently handled. The top and back oven plates are usually placed on one board, the front oven plates and rack on another, the four covers and two short centers on a third, and sometimes the long center is put on the same board with the covers and short centers; all the oven doors and front doors are generally placed on one board, and so on. The patterns are all oil-oiled, so as to make large boards, and few of them. For a set of patterns for an ordinary cooking stove, from fifteen to twenty follow-boards are required, according to the Western style, and

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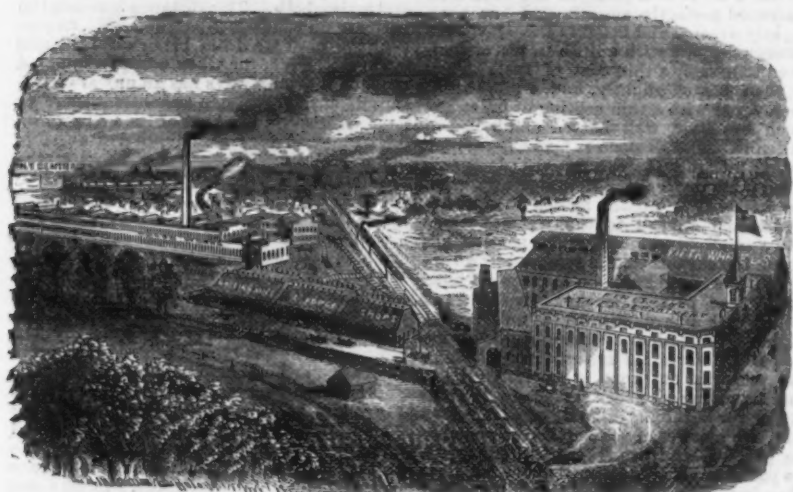
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This Hose is in use in over 300 Fire Departments; weighs but 58 pounds to the section of 50 feet; will stand a pressure of 400 pounds to the square inch; guaranteed for three years; will retain its strength for many years. We have many testimonials showing continuous service for nine years, where the hose is in good condition for fire service.
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Finishing,
Flat,
Flat Equaling,
Flat Wood,
Gang-Edger,
Ginsaw,
Gulleting,
Half-Round,
Half-Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-End),
Handsaw Taper, single cut,
Handsaw Taper, double cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,
Square Blunt,
Square Equaling Files,
Stave Saw,
Three-Square Files,
Three-Square Blunt Files,
Tumbler Files,
Union Cut,
Warding Files,
Warding Blunt File,
Warding Round Edge File.

RASPS.

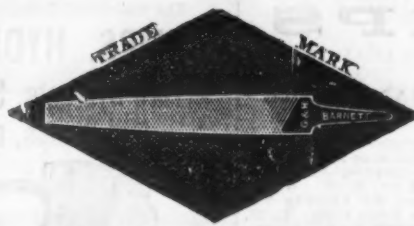
Baker's,
Beveled Edge,
Bread,
Cabinet,
File, Flat and Half Round,
Flat Shoe,
Flat Wood,
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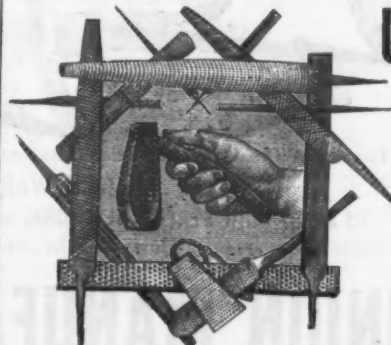
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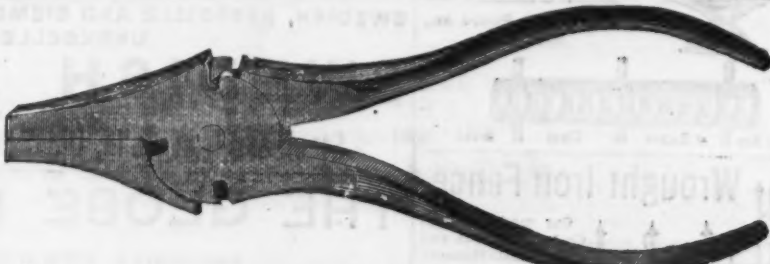
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Specially Adapted for Use on Wire Fence.

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Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

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This Bucket is struck out from the best charcoal iron; consequently is very durable. It requires 50 per cent. less power to run it than the old-fashioned square bucket, and will outwear half a dozen of them. Over 300,000 are now in use by the principal Millers, Brewers, Distillers and Manufacturers at home and abroad. It is the best Bucket made.

CAUTION.—The popularity of the DUC BUCKET has caused many manufacturers of the old style of Elevator Bucket to closely imitate its spherical shape. We warn all parties against patronizing infringers of our patents, as they will be held accountable. Send for circular. Address

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The Mill Bucket, in sizes from 3 1/2 to 16 inches.

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Manufacturers of NORWAY IRON RIVETS of Superior quality.

We carry a large stock of the various sizes of *Tinners', Carriage, Wagon, Hame, Belt, Barrel, Safe and Tank Rivets*, and make promptly to order all sizes and lengths not larger than 7-16 inch diameter. We have a capacity of two tons of the various sizes of small Rivets per day of ten hours. Freight allowed to all points on or east of the Mississippi River.

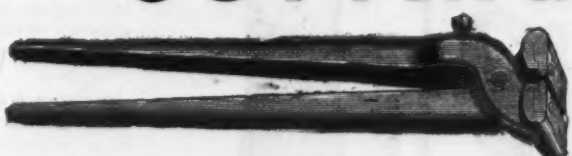
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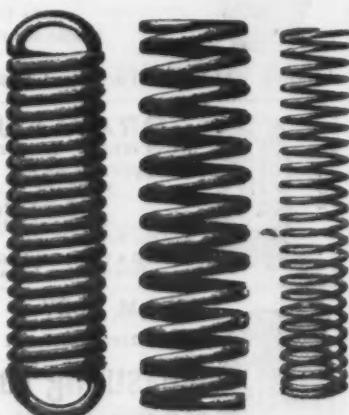
The cutting parts are made to gauge, of choice steel. They can be taken off to be ground, and when worn out can be replaced at a slight expense, making the tool as good as new.

This improvement makes the tool the best and cheapest that you can have in your shop.

All extra cutters warranted to interchange.

The center of rivet being only three-fourths of an inch from the cutting edge, they have nearly double the cutting power of most other kinds.

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Our Springs are used by the U. S. Government and various Meteorological and other Scientific Institutions.

THE ANSONIA CORRUGATED STOVE PLATFORM, With Patented O. C. Border.

ROUND ZINC.

27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring no nailing or lining, the edge retaining its form. Superior pattern, finish and quality. Price as low as any.

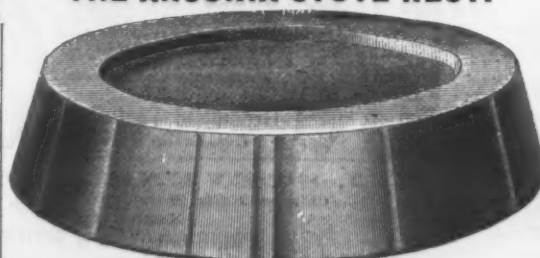
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Packed 12 in each case.



Cut Showing Round Platform.

THE ANSONIA STOVE REST.



This Cut is the Actual Size of 2-inch.

STOVE RESTS are designed to place under the feet of Stoves and Ranges, for the purpose of raising them from the floor or platform. They are about 1/2 inch thick, covered with sheet metal in zinc, brass and nickel plate. Highly polished and finished. Packed one set of 4 pieces in each paper box, and 36 sets in each case. Sizes (inside of circle on top)

2, 2 1/2, 2 3/4, 3 1/2 inch.

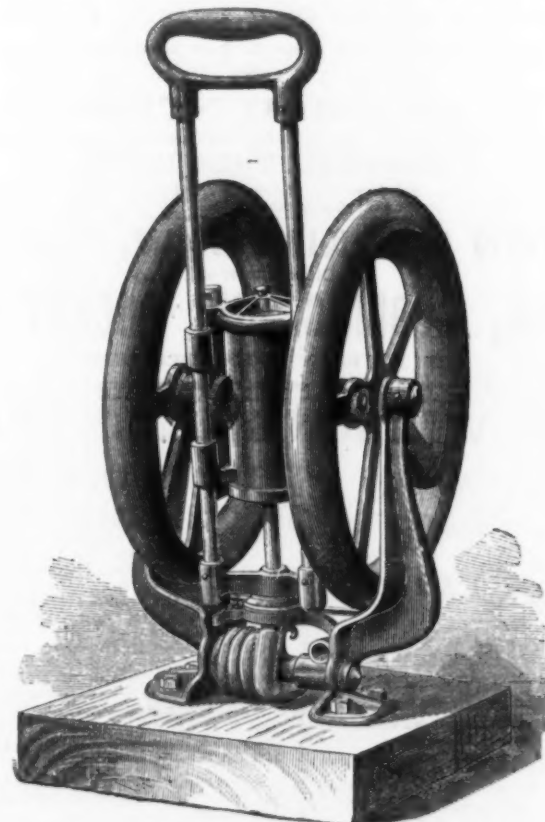
Send for full Description and Prices.

ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

from twenty to twenty-five would be necessary according to the Eastern style. Whether large or small boards are better is a disputed question that has not yet been decided. but Western foundries are not making their boards as large at the present time as in former years, and I think the medium-sized boards are better than the extremely large or extremely small ones. In the majority of foundries the follow-boards are allowed to remain in the foundry while in use, and when not in use are stored in the pattern room or loft with the patterns on them; but in many large foundries the patterns are taken off the boards every night and brushed up and beeswaxed or repaired, if necessary, and stored in the pattern house for the night. In the morning each molder finds his patterns in a box bearing the number of his floor. If the molder does not come to work, or if the pattern is not used, it is not taken into the foundry, and no pattern is allowed to remain in the foundry but those in actual use.

The Weindel Air Pump.

With a view to meeting the demand from various sources for portable air compressors and air pumps of small size but a wide range of capacity, Mr. H. Weindel, of Philadelphia, has brought out a series of styles of an air pump, the distinctive features of which are shown in the accompanying engraving, which represents the "Acme" pump. A



THE ACME AIR PUMP.

lever is used to rotate two fly-wheels. These, in turn, take a cylinder around which is suspended between them, thereby forcing it up and down on a slide provided on the lever. The latter contains the piston and hollow piston rod through which the air or gas is expelled or exhausted, as the case may be. The connection between pump and receiver is made by rubber tubing attached to the lower end of the lever. By this arrangement a great leverage is obtained just where it is wanted, toward the end of the stroke—a very desirable feature in air pumps. The wheels can be given a speed of from 150 to 180 revolutions a minute, making their momentum from four to nine times as large as would be possible if they were rotated at a smaller speed by means of a crank. The particular fanning motion of the rotating cylinder makes it possible to go a great deal further in compression, without overheating the parts, than in machines with the cylinder at rest, and it has been found that 300 pounds pressure can be attained in such pumps without injury to the leather valves or piston packing, the water-cooling apparatus with which they are provided hardly being found necessary, except in a long continued pump, at the highest pressure the pump can yield.

The "Acme" pump, which we illustrate, has a cylinder of 2 by 4 inches and 12-inch wheels, and is capable of compressing air to 25 to 40 pounds per square inch. A smaller size, the "Pearl" pump, also double-acting, has a cylinder 1 9/16-inch in diameter and 3 inches long, and possesses 10-inch wheels. It has a weight of only 18 pounds, and yields air compressed to 50 pounds per square inch. Besides these, Mr. Weindel makes pumps for special technical and scientific purposes, such as machines for compressing gas up to 300 pounds per square inch for calcium light apparatus, vacuum pumps worked with the aid of mercury filling, and larger pumps driven by four men for brewers' use.

At the last meeting of the trustees of the East River Bridge the action of the Executive Committee was ratified, awarding the contract for the bridge in the New York approach over Franklin square to the Delaware Bridge Company for \$120,000. The contractors are to give bonds for \$25,000. The financial statement showed that the total receipts to January 1, 1881, were \$12,644,841.68, the expenditures \$12,575,403.02, and the cash on hand \$69,438.66. In response to a question from John T. Agnew, asking what progress was making in the Edgemoor Company under its contract for furnishing steel for the superstructure, President Murphy read a letter from Edgemoor Company which is superintending the work.

*NOTE.—A molder was never known to break a pattern. It was always broken when he got it, if broken at all. Who breaks the patterns is a mystery that the founder has never been able to solve.

He stated that the Midvale Steel Works had received from the Cambria Iron Works 2857 tons of the steel blooms for the bridge (about half the entire quantity), and 1160 tons had been rolled and sent to Edgemoor to be manufactured. Of the floor beams, made in two sections, 77 sections had been made and 230 steel trusses. President Murphy said that a beam would be put in place in a few days in the bridge. Gen. Slocum stated that the work could go right on despite the weather.

The Latest Rapid Transit Scheme.

An eccentric Berlin philosopher announces that he has discovered a way to make a trip around the world in 24 hours. He says that he is informed by the captains of ships that birds are seen at sea a thousand miles or more from land, and pronounces it self-evident that they must reach shore in a very short time, since they cannot find a resting place in mid-ocean. From this he conceived the idea that they merely raise themselves aloft, and, with only enough motion to keep afloat, remain as nearly stationary as possible, while the earth revolves around under them. All they then have to do is to wait until the desired spot on the earth's surface comes along, and thereupon comfortably to lower themselves to solid ground. This ingenious practice on the part of birds the Berlin man proposes to imitate for mankind, with the assistance of a balloon and passenger car of peculiar construction that he has invented,

The Howe Shear.

The accompanying illustration of a new shear for cutting round and flat bar iron merits attention. The inventors, Messrs. Josephs & Howe, of Philadelphia, claim that it will cut the iron clear off, requiring no finishing or filing on the edges, as is the case with some other machines designed for this



THE HOWE SHEAR.

purpose. As will be seen from the illustration, it is exceedingly simple in construction. All the shears are polished and made entirely of steel and wrought iron. It is made in three sizes, of which No. 0 is guaranteed to cut 1 x 3-16ths inch flat and 1/4 inch round, while No. 1 can be used for 1 1/4 x 1/4 flat and 1/2 inch round, and No. 2, 2 1/2 x 5-16ths flat and 3/8 inch round bar.

That the hardest steel is not the most durable for railroads, appears from an examination of the wear of steel rails on the Great Northern Railway, England. Several of the rails which lay side by side on this line were taken up and tested, and it was found in one instance that a hard rail had been worn away 1-16 inch by traffic amounting to 5,251,000 tons, while a soft rail, for the same amount of wear, had withstood 8,402,000 tons. In another instance the total was 15,531,000 tons for the hard rail and 31,061,000 for the soft rail, the wear being the same viz., 1-16 inch.

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FRIEDMANN & LAUTERJUNG,

Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave
"ELECTRIC RAZORS,"
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Agents for the BENGALL RAZORS.
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MERIDEN CUTLERY COMPANY.

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The oldest manufacturers of Table Cutlery in America. Exclusive makers of the CELLULOID HANDLE
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OUR BUTCHERS' and HUNTERS' KNIVES
Are warranted to be equal in style, finish and quality, to any goods made in the world.
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We are the sole owners of the Gardner Patent Guard and Rest for Carving Forks, and
the manufacture of fine carvers is with us a specialty.

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OF EVERY DESCRIPTION.

My Blades are forged by hand from the best cast steel and warranted. Established 1853.

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"FOUR PEPPERCORNS AND A DIAMOND."
GRANTED A D 1766 BY THE
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We have it. Will be pleased to execute your
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WROUGHT IRON
ADJUSTABLE
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Recommended as
the best Hand Clipper
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Extra pieces for
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DOUBLE-ACTING SPRING BUTTS,

SABIN'S LEVER DOOR SPRINGS, For heavy doors,

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HOG RINGER
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Only double Ring ever
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Ring that will effectually
keep Hogs from
rooting. No sharp
points in the nose.

Rings, 75c. Rings, 50c. no. Holders, 75c. Hangers, 15c.

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HOG AND PIG
RINGER AND RINGS.
Only single Ring in
the market that closes
on the outside of the
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in the nose to keep it
sore.

Can be obtained only from the
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PRICES FURNISHED ON APPLICATION.

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And of
BALL'S PAT. SOLID STEEL SHEEP SHEARS.

These shears are unsurpassed for cheapness, durability and utility. They are made of one solid piece
of steel from point to point, and cannot be broken in
use either in the bow or at the junction of the shank
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productions having considerably increased, they
have, in order to meet it, greatly extended their
Manufacturing Premises and Steam power.
To distinguish Articles of Joseph Rodgers
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All sorts of Hardware and Merchandise for import
and export purchased on commission.

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The best
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Guaranteed.

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PERFECTION For Portability.
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Handles of German Silver, Nickel Plated. Blades of the
Finest Steel in the World. Every Razor Fully Warranted.

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A. G. COES & CO.
WORCESTER,
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Successors to
L. & A. G. Coes,
Manufacturers of
THE GENUINE
COES
Screw
Wrenches.

PATENTED,
May 9, 1871.
December 20, 1871.
December 28, 1875.
August 1, 1876.

The backstrain when the wrench is used is borne
by the bar—not by the handle.
The strongest Wrench made, and the only suc-
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None genuine unless stamped

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Our Agents, GRAHAM & HAINES, 113 Chambers St.,
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FOR
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IT HAS
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Wrought Bar, Head
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Owing to the in-
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Our Wrench hav-
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"DRAW CUT"
BUTCHERS' MACHINES.
Choppers, Hand and Power
Stuffers.
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Warranted thoroughly made
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For Boring Pump Logs and Pump
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We are sole agents for these Clippers. All or-
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Table Knives, Razors, Shovels, &c., &c.,
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Manufactured by COPELAND, HALL & Co.,
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Fine Mandrel-drawn Tubes, from Brass or Ger-
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Send for il-
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For Fine Cutting Qualities, and Adapta-
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THE WM. ROGERS MFG. CO. Superior Silver-Plated Table Ware.



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NEW YORK OFFICE, NO. 100 CHAMBERS STREET.

HALL, ELTON & CO.,
Electro Plated Ware, German Silver and Britannia Spoons.



Factories, Wallingford Conn. Salesroom, 75 Chambers Street, New York.

HOLMES, BOOTH & HAYDENS,
MANUFACTURERS OF
Finest Quality Silver-Plated Spoons, Forks, Knives, &c.

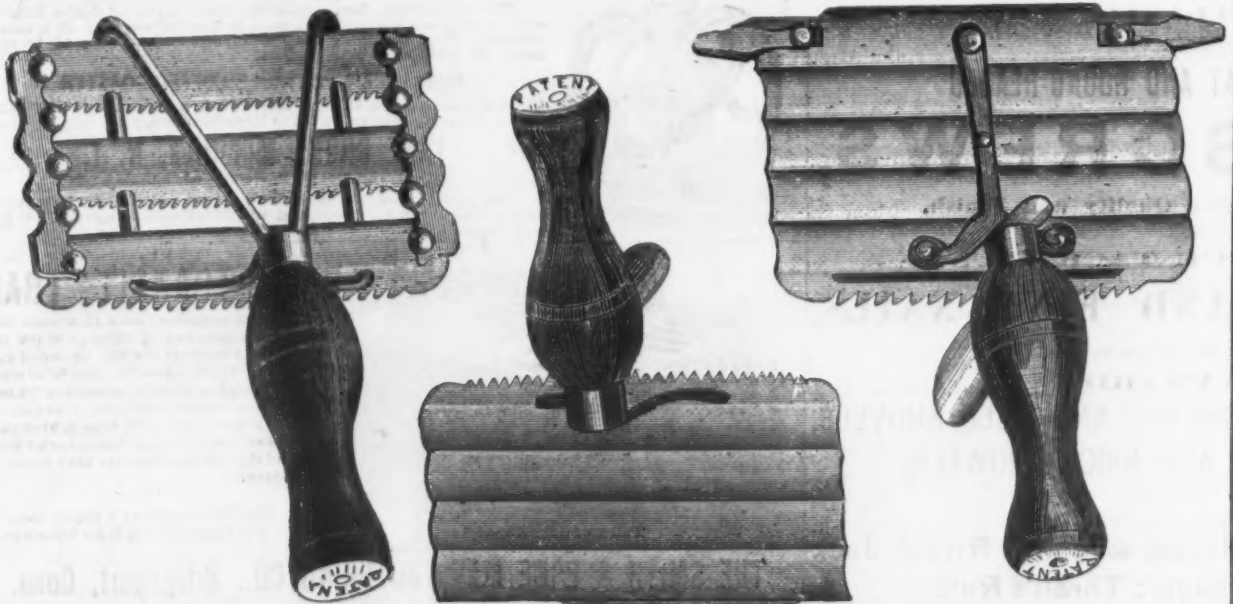


NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 12 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

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CAST IRON & NICKEL PLATED STEEL SHEARS.**

Representing THE LEE ARMS CO., THE GREENFIELD CO-OP. WORKS, J. K. RUPERTUS, THE RENZ HARDWARE CO., C. S. SHATTUCK, THE BALTIMORE SHEAR CO.

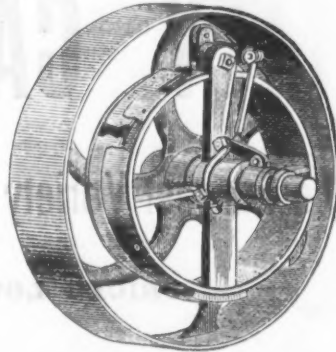


Our arrangement with Messrs. Graham & Haines as agents for our goods having expired, we shall hereafter have no agencies, but shall sell our own goods direct to the trade. We are confident it will be to your advantage to defer buying any Combs until you have inspected and priced our new lines,

"THE PIONEER,"
which we are manufacturing in connection with the "PERFECT," but which are not subject to the conditions governing the prices of the "PERFECT," and are universally acknowledged to be the best low-priced Combs ever offered to the trade.
Catalogues with Discounts, &c., sent on application.
LAWRENCE CURRY COMB CO.,
309 EAST 22d STREET, NEW YORK.

Oesterlein's Friction Clutch.

The accompanying illustration shows a newly patented form of friction clutch, in which the novel idea of using a friction strap or brake to form the clutch proper, has been worked out. Upon the sides of the loose pulley-spokes a drum or cylindrical face has been formed, and around this is passed a strap, the ends of which are fastened to a sort of ball, or, more correctly perhaps, a T-crank. This crank is carried by the shaft itself by means of an arm or plate attached to a suitable hub. The outer end of the crank is fastened to the hub by means of a pair of links, forming a toggle joint. A sliding collar, seen on the right of the cut, takes hold of the middle of the toggle by means of a link. When this collar is slid outward or inward on the shaft, the T-crank is partially revolved, and the brake strap



OESTERLEIN'S FRICTION CLUTCH.

made to grip the flange on the spokes of the idler. As the two arms of the crank attached to the brake are short, and the other of considerable length, the gripping power, when the sliding collar is thrown out, is enormous. In the cut, a portion of the strap is broken away to show the portion of the pulley which is gripped, while an outside or covering rim is also broken away to show the strap. Mr. William Oesterlein, of Cincinnati, Ohio, is the inventor and patentee.

A Stove Manufacturer on Protection.

The following clear, logical and intelligent exposition of the practical advantages of protection, by Mr. John S. Perry, of Perry & Co., Albany, N. Y., will be read with interest:

The theory of free trade is plausible enough on the surface, but it fails to bear the cold logic of figures when applied to the present conditions of our country.

If the physical condition of civilized nations were substantially uniform, so far as regards the cost of food, fuel, wages and money, it is possible that tariffs for protection might safely be abolished—but not until then.

Even under our present protective tariff, which some people call high, taking iron and steel for examples, the amount imported into this country in various forms during the past 14 years, and particularly during the past year, reaches figures almost beyond belief.

In view of the fact that these vast amounts could easily have been produced within our own borders, bringing blessings and prosperity in their train, they are melancholy figures to the patriot.

Some statistics on this subject may, perhaps, be new to the general public.

The importation of pig iron into this country from July 1, 1866, to July 1, 1879, was 2,418,493 tons, at a cost of not less than \$50,000,000. Giving a yearly average of \$3,571,428. The amount imported for the year ending July 1, 1879, was 98,085 tons. Same for the year ending July 1, 1880, 84,216 tons.

The latter showing an increase upon the average of the previous 13 years of 354 per cent., and upon the importation of 1879 of 762 per cent.

This importation of 1880 cost the country at least \$16,000,000. The importation of manufactured iron during those 13 years amounted to 3,876,768 tons at a cost of not less than \$120,000,000. Giving a yearly average of \$9,231,333. The amount imported for the year ending July 1, 1879, was 15,324 tons. Same for the year ending July 1, 1880, 961,588 tons.

The latter showing an increase upon the average of the previous 13 years of 222 per cent., and upon the importation of 1879 of 617 per cent.

This importation of 1880 cost the country at least \$30,000,000. The importation of steel in its various forms during those 13 years amounted to 1,037,060 tons at a cost of not less than \$50,000,000. Giving a yearly average of \$3,871,428. The amount imported for the year ending July 1, 1879, was 2,294 tons. Same for the year ending July 1, 1880, 74,261 tons. Showing an increase upon the previous year of 2439 per cent.

This importation of 1880 cost the country at least \$4,000,000.

RECAPITULATION FOR 13 YEARS ENDING JULY 1, 1879.

	Tons.	Cost.
Pig Iron	2,418,493	\$50,000,000
Manufactured Iron	3,876,768	\$120,000,000
Steel	1,037,060	\$50,000,000
Total	7,332,321	\$220,000,000
Yearly average	564,025	\$16,923,076

RECAPITULATION FOR YEAR ENDING JULY 1, 1880.

	Tons.	Cost.
Pig Iron	84,216	\$16,000,000
Manufactured Iron	961,588	\$30,000,000
Steel	74,261	\$4,000,000
Total	1,881,065	\$50,000,000

Thus showing an increase of 233 per cent. in quantity over the average of the previous 13 years.

The duty upon foreign pig iron is \$7 per ton; upon manufactured iron, \$14 to \$50—say an average of \$25; upon steel, \$25 to \$50—say an average of \$30.

In addition, these goods are subject to charges for freight, insurance, commissions, exchange, wastage, &c., all of which is paid by the exporter, either directly or indirectly, by a commensurate discount in the prices of the same.

Notwithstanding these heavy charges, amounting upon the importations before mentioned to more than \$200,000,000, a sum that would appear well-nigh prohibitory,

these importations have depleted us of \$270,000,000 of gold or its equivalent, which should have remained to be distributed among our own people—an amount that would give nearly \$6 to every man, woman and child.

We have at hand all the elements for the production of these metals—the ore, the coal, the labor, the skill, the food, the capital, and yet, with a protection in duties and expenses at \$10 to \$30 or \$40 per ton, we allow Great Britain to supply our market with 9,250,000 tons in the space of 14 years.

The question naturally arises, how can she compete at such a cost with our producers and manufacturers?

The Hon. Carroll D. Wright, Chief of the Bureau of Statistics of Labor for Massachusetts, has effectively answered it. He has shown that the average weekly rate of wages of forty-two trades and occupations in that State in 1878 was \$10.71, while the same in England was \$6.21; difference, \$4.50, or 73 per cent. in favor of the working people of Massachusetts. Would it be humane or even profitable to ask them to work for the starvation wages of England?

But this is not all. Col. Wright has given us the other side of the picture, in the relative cost of food in the two localities.

Taking thirty-three prime articles, he reports the cost in England in 1878, for a unit of each, as \$7.22; for the same in Massachusetts, \$5.28; difference, \$1.94, or 73 per cent. in favor of the working people of Massachusetts. That is to say, an average worker in that State, in the trades named, earned per week \$10.71. The cost of a unit of thirty-three articles of food per week was \$5.28; surplus, \$5.43; while an average worker in England in the same trade earned per week but \$6.21, and was subjected to the cost of a unit of the same thirty-three articles of food of \$7.22; deficiency, \$1.01.

From this statement it may be assumed that the Massachusetts worker enjoys a generous diet, while the English worker must be satisfied with a very meager diet.

Is it not a logical sequence that a reduction of the duties upon iron and steel would have the effect to reduce, in a corresponding ratio, the comforts and necessities of our workers in the metals named?

I am not interested in the manufacture of any articles that need protection. On the contrary, it would appear upon the face that my interests would be promoted by a reduction of the duties; therefore, it may be assumed that my views are quite independent of any selfish considerations.

I will close this paper by propounding a conundrum.

If, with the heavy burden of duties and expenses before named, it was possible for Great Britain to send to us during the single year 1879-80, the enormous amount of 1,881,065 tons of iron and steel, what amount would she have sent if the duties of \$7 to \$35 per ton had been removed or materially reduced?

Box's New Patent Light Portable Quick Hoist.

The need of a light, portable and cheap quick hoist for use in machine shops, stores and places where only one man can be spared to handle 300 to 500 lbs. has long been felt. The manufacturers of Box's new quick hoist claim to meet this want in every particular. The accompanying cut of their hoist will give some idea of it. It is very light, weighing but 20 lbs. without chains. It claims to have all the advantages of other quick lifts without their defects. The power is obtained by the use of a large wheel, combining with it the lifting wheel, utilizing what is known as lever power. The brake is strong and efficient for rapid or easy lowering. Both hand and lift chain are guided by



BOX'S NEW PATENT LIGHT PORTABLE QUICK HOIST.

Box's patent brakes. There is nothing about the hoist to break or get out of order. One special advantage is that both ends of the lift chain can be used at the same time in long lifts, inasmuch as a load can be lowered and another hoisted at the same time, or a heavy load be made to raise a light one. The brake makes this practical and easy. The price is very low, and will be a great item in their sale, which is already very great. The manufacturers are Alfred Box & Co., 312 and 314 Green street, Philadelphia, Pa.

Mine Accidents in France.—In discussing the question of accident funds in connection with mining, in the Chamber of Deputies, M. Brossard gave the following table of accidents, &c., which had occurred in France since 1870:

Year.	Number of workmen.	Number of persons killed.	Number of persons injured.	Proportion of killed per person employed.	Proportion of injured per person employed.
1870.....	93,804	255	1,355	0.0027	0.0144
1871.....	93,155	276	1,307	0.0030	0.0140
1872.....	103,580	213	1,753	0.0022	0.0169
1873.....	118,413	205	1,858	0.0022	0.0159
1874.....	118,430	213	2,070	0.0020	0.0175
1875.....	119,733	243	2,160	0.0020	0.0176
1876.....	124,518	420	1,228	0.0035	0.0101
1877.....	130,500	247	1,194	0.0020	0.0100
1878.....	117,609	173	1,141	0.0015	0.0097

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

SARANAC HORSE NAIL CO.

Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer. **PLATTSBURG, N. Y.** **J. W. LYNDE, Secretary.**

ELY & WILLIAMS, Gen'l Agents for Eastern and Middle States, 1232 Market St., Philadelphia; 178½ Water St., New York; **SARANAC HORSE NAILS, Blued or Polished.**

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SAM'L G. B. COOK & CO., Agents for Southern States, Nos. 67 and 69 (old Nos. 5 and 7) German Street, Baltimore, Md.

Terms, Cash, within 60 Days.									
Nos.	5	6	7	8	9	10			
Cts.	26	23	21	20	19	18			

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W. & C. Scott & Son's,
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BREECH LOADING GUNS.



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Importers and Jobbers,
AMERICAN BREECH LOADING
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GUNS

CHEAPEST AND BEST GRADES.
ENGLISH MUZZLE LOADING
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FLOBERT RIFLES, Plain and Remington System.

BRITISH BULL DOG REVOLVERS, 38, 44 and 45 Calibre.

Agents for COLT'S and ROBIN HOOD line of REVOLVERS, BRIDGEPORT GUN IMPLEMENT CO.'S GOODS, UNION METALLIC CARTRIDGE CO.

THE PATENT SELF-FEEDING STAPLE SET-TER FOR WIRE FENCES.



Holds 50 Staples, saves one man's work, saves torn hands and mangled fingers, enables barbed fence to be put up in the coldest weather and with thick gloves, and is warranted of the best steel and malleable iron. Price, \$5.00 each.



For Illustrated Catalogue of our own patented specialties, address Phila. Novelty Manufg. Co., 321 Cherry St., Philadelphia, Pa. Export Agents, Fairbanks & Co., 311 Broadway, N. Y.

T. NEW'S PREPARED ROOFING

For steep or flat roofs. Applied by ordinary workmen at one-third the cost of tin. Circulars and samples free.

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Of all kinds, of Superior Quality and Finish.

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TACKS, BRADS AND FINE NAILS,

Of every description, for home and export trade, and

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C. S. HOES, PLANTERS', HILLING, BOG AND FIELD SHOVELS,
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Offers from stock an assortment of

Nettlefolds' Screw Eyes, Hooks, &c., and Rivets, Jack
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Ausable, Canton and Vermont Horse Nails.

BRASS PADLOCKS

IMPROVED PADLOCKS for Railway Switches and Freight Cars, used by many leading roads; also, Master Keyed Padlocks for Tool Houses, &c. The above made to order only, and have flat steel Keys. Our well-known six and seven tumbler cast brass Padlocks, with or without Chain or Nickel plating, are handled to good profit by both home and foreign trade. We guarantee to make no two keys alike in a million. For security, durability and convenience, skilled mechanics say they have no equal.

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THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Millbrook, N. Y.

Also sold by leading wholesale houses.

Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.



THE 'RAPID TRANSIT' TRAP

Has no superior, and is a sure and certain catcher of Mice. With the Metal Platform resting on wood bottom of Trap, an invitation is always extended to Mice of whatever "kind, color or condition of race," into secure and grated quarters, from which they are released by opening cover of Trap and depositing contents into a pail of water.

The Mice go in at a rapid rate, And each one sets it for his mate.

Patented August 27, 1878.

Manufactured by

THE SMITH & EGGE MANUFACTURING CO., Bridgeport, Conn.

Delusion Rat and Mouse Trap,

Formerly manufactured by

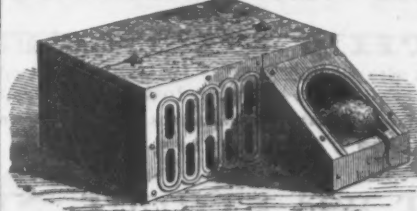
CLAUDIUS JONES & CO.,

At Bridgeport, Conn.,

Have Removed to ERIE, PA.

This is the most successful Rat and Mouse Catcher on the market.

Send for Price Lists.

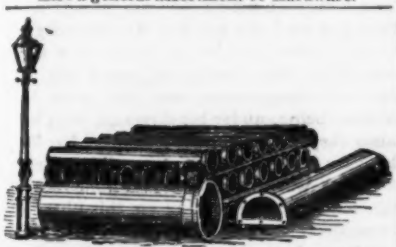




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84 Chambers St., New York, Agents for American Screw Co.'s Wood Machine and Rail Screws, Store and Tire Bolts, Rivets, &c. G. F. Warner & Co.'s Carriage Clamps.

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FOR WATER AND GAS.
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Mathew's Pat. Anti-Freezing Hydrants
400 CHESTNUT STREET.

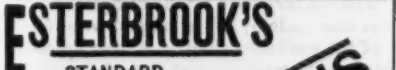
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MALLETS,
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also all kinds of Handles, Sledge, Chisel and Hammer Handles. Also
COTTON AND BALE HOOKS,
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JAMES COMLY,

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Manufacturer of
Hardware Novelties, Glass Cutters, &c.

Vulcanized Rubber Fabrics

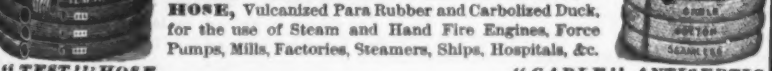
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MECHANICAL PURPOSES.
RUBBER BELTING and PACKING.



This company manufactures the immense DRIVING and ELEVATOR BELTS for the Buckingham Elevators at Chicago, which have been running perfectly for more than twelve years, also those for Armour, Dole & Co., Chicago, and Vanderbilt's great elevators of the New York Central and Hudson R. R. Co., New York, being the largest belts in the world. We are now making an Elevator Belt, 36 inches wide and 300 feet in length, which will weigh over 15,000 pounds.

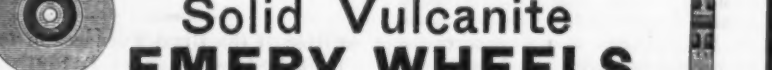
LINEN and COTTON HOSE,

Pat. 554. Plain and Rubber Lined. Pat. July, 1873.
Circular Woven-Seamless Antiseptic RUBBER LINED "CABLE" HOSE and "TEST" HOSE, Vulcanized Para Rubber and Carbolized Duck, for the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.



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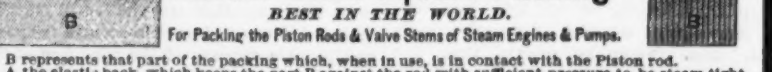
Patented. ORIGINAL
Solid Vulcanite EMERY WHEELS
Pat. Jan. 26, 1880. Pat. Jan. 26, 1880.
LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.



The properties of these wheels are such that they can be used with great advantage and economy for cutting, grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble, Glass, etc. These wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools, Flow, Saws, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small Machinery of almost every description.

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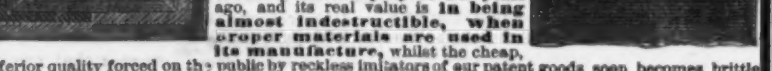
BEST IN THE WORLD.
For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps.
B represents that part of the packing which, when in use, is in contact with the piston rod. A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.



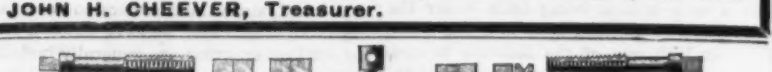
This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

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Pat. 11,268, 213,061. For Halls, Flooring, Stone and Iron Stairways, &c. Pat. July, 1879.
This practical and indispensable article—especially for wear where exposed to ice, snow, or slush—was first introduced by this company several years ago, and its real value is in being almost indestructible, when proper materials are used in its manufacture, whilst the cheap, inferior quality forced on the public by reckless imitators of our patent goods soon becomes brittle and crumbles to pieces. Address



NEW YORK BELTING & PACKING CO.,
Warehouse, 37 and 39 Park Row, New York.
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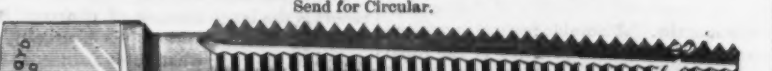
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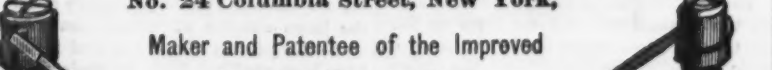
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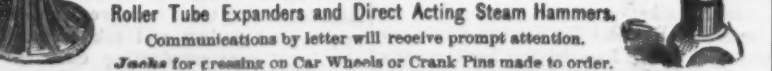
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REVIEW OF THE WESTERN IRON TRADE FOR 1880.

The year 1880 will be a memorable one in the annals of the iron trade, and will long serve as a guide or example to be referred to, either as a warning or an incentive to action. It opened with the market in a most excited condition. Forge Pig Iron had advanced from \$17 @ \$18, the ruling rate in the spring of 1879, to \$38 @ \$40. Bar Iron from 1.70¢, 1.60¢, perhaps lower, to 3 1/2¢ card on Jan. 2, with mills refusing to accept orders in any large quantities even at that rate for future delivery. Nails, which were nominally \$2 @ \$2.25, and even sold as low as \$1.80, if not lower, were firm at \$4.25, and were advanced to \$5 Jan. 12. Ore had made a strong bound, and odd lots that had been bought at \$7.50 a ton at Cleveland early in 1879 were resold at \$15, and for the season of 1880 the ore producers were discussing the propriety of asking \$12 @ \$12.50 for the best ores.

The early part of the year saw no abatement in the excited and upward state of the market. A most unaccountable fear had taken possession of the large consumers of iron that the capacity of the mills and furnaces of the country was not sufficient to supply the demand that would be made upon them, and consumers almost frantically rushed their orders upon the mills and furnaces to cover the iron for contracts already made, and to provide for possible future ones. This same belief in the lack of capacity to meet the demand also led to very heavy speculation, not only in home made, but in foreign iron.

Under the stimulus of this speculation and speculative consumptive demand, Pig and Bar Iron and Nails kept advancing the first month of the year. The last week in January Bar Iron was advanced to 4¢; Nails, Feb. 11, to \$5.25, and Gray Forge Pig Iron was selling at \$40 @ \$48.

These advances marked the high tide, and the reaction began. Consumers had covered all their contracts and the high prices checked many improvements. Iron that had been ordered from abroad late in the fall or early in the winter began to arrive, and the whole world seemed to have been scouring to furnish raw material and finished iron for the United States. Ore, Pig Metal, Bar, Hoop, Sheet and other forms of Merchant Iron, Steel in all forms, and cargoes of Scrap were unloaded at our wharves. The ores of the Mediterranean and Old Rails from India and China were some of the material that found their way to us.

Under such a load prices began to break, and the decline was faster than the advance. It is probable that less iron and nails were sold after the card had been advanced to the highest rates, than was sold at those same rates before the card was advanced. The attempt was made during the whole month of February to sustain the card rates, but orders fell off at once. The Foreign Iron that now began to arrive in great quantities, was offered way below the ruling rates of American Iron. The full effect of this was not felt at once, as there was an impression abroad that the amount coming into the country was not as large as it proved to be, and if it was, it was not of a good quality. During the early part of March the attempt to sustain the card was continued, and, as many of the mills had large orders, but little iron was sold. On the 18th of March, the Western Iron Association met and affirmed the 4¢ card, but early in April all attempts to hold the card at that high point were abandoned, and on April 8, the card on iron was reduced to 3.25¢, and April 28, the card on Nails to \$4.00. On May 5, iron was reduced to 2 1/2¢ card; May 12, Nails to \$3.25, and July 28 to \$3.00. The reduction in Bar Iron on April 8 led to a decline of \$8.00 @ \$10.00 in Pig, to be followed by further reduction, which brought Pig \$23 @ \$25 the last of May. During this month the ore companies announced a reduction in the contract price of Lake Superior Ores of \$2.50 @ \$3.00 a ton. During the last of May and the first week in June the annual discussion of the puddlers' scale, caused a slight disturbance in the market. During June the feeling became fixed that the decline had spent its force, and the demand became quite active again. Some large orders were placed for Bars. Most of the mills had reduced their stocks of Pig Iron and began to purchase, and an active demand with slightly increased prices followed.

This ended the first half of the year. The second part was uneventful. Forge Iron ruled at \$21.00 @ \$23.00; Bars, \$2.10 @ \$2.25; Nails, \$2.65 @ \$3.00, during nearly the entire six months. At the beginning of December, however, the whole outlook became brighter. The orders offered exceeded anything before known in the history of the trade, and under its stimulus prices began to stiffen. During the month Nails were put at \$2.95 card, and at a meeting of Bar Iron manufacturers at Pittsburgh, it was resolved to try to hold Bars at 2 1/4¢, the manufacturers believing that the price of raw materials and labor and the demand fully justified it.

We give below in condensed form a statement of prices, &c., under each head for the year.

Ore.

The price for the season's delivery of 1879 was \$7.50 for Republic ore at Cleveland. There was no variation from this price on contracts, but what surplus the mines had was sold at almost any price that they chose to ask, \$7.50 being a ruling price for ore for six. The ore companies fixed their price for the season's delivery on the basis of \$12.50 for Republic, which was afterward reduced \$2 @ \$3. The production of Lake Superior ore was the largest ever known, reaching very nearly 2,000,000 tons. The price for 1881 has not been definitely fixed yet, but it is understood that it will be about the same as 1880.

Pig Iron.

In the previous part of this review we indicated the course of the Pig Iron market, and need now only give the range of prices. The following table, compiled from actual sales, shows the range of prices at Pittsburgh of Gray Forge, Coke or Bitumi-

nous Iron, made in whole or part from Lake Superior ores:

Jan.	\$37.00 @ 45.00	July.	\$19.00 @ 28.00
Feb.	40.00 @ 45.00	Aug.	22.50 @ 28.50
March.	38.00 @ 43.00	Sept.	22.50 @ 28.50
April.	39.00 @ 40.00	Oct.	22.50 @ 28.50
May.	29.00 @ 39.00	Nov.	22.50 @ 28.50
June.	19.00 @ 25.50	Dec.	20.00 @ 21.00

The dates of the changes in the card are as follows:

Jan. 2, 80, from 3¢ to 3 1/2¢	April 8.	3.25
Jan. 30.	May 5.	2 1/2¢
March 28.		

The changes in the card during the year are as follows:

Jan. 12, from \$4.25 to 5.00	May 12.	\$3.25
Feb. 11.	July 28.	3.00
April 8.	Dec. 28.	2.85

The Requirements of the Census Bureau.

The Superintendent of the Census has sent to the Secretary of the Interior, for transmission to Congress, a communication asking for an additional appropriation of \$500,000 for the completion of the census work and the publication of the results. The superintendent reviews the causes which have made expenditures in excess of the original plans of the Census Office necessary. These are the great rise in prices and wages which occurred prior to the beginning of the census, involving a large increase in the cost of field work; secondly, the surprising growth of population during the decade, the census discovering a population of 2,000,000 in excess of the highest estimate of the office; thirdly, the unexpected wealth of opportunities found in the work of the various special agents of the office, especially in the departments of forestry, mining, meat production, the fisheries, wages, and machinery, the factory system, the manufactures of iron and steel, and of textile fabrics, the cultivation of cotton, tobacco, and the several cereal crops, the social statistics of cities, and the statistics relating to the defective, dependent, and delinquent classes. The superintendent says that work of this kind has never before been undertaken on any larger scale under authority of the United States Government, and the field has been found surprisingly rich in statistical material. He would regard it as a great loss to the country if the investigations already begun cannot be fully carried out. If sufficient provision shall be made for continuing these investigations, the tenth census can be made an almost perfect inventory of the industrial, social, and vital condition of the people of the United States.

A fourth cause for the increase of expenditure is the occasion for a more rigid revision of the schedules than was ever before undertaken, a more varied compilation of results and a wider correlation of facts. The schedules of enumeration form a mine from which the value of the product obtained may be increased with every successive application of labor in compilation and tabulation. The superintendent is very desirous to be enabled to work up the rich mass of material which has been brought into his office by the labors of the 31,000 enumerators and the hundreds of special agents and experts who have been employed during the past year. The appropriation asked for would raise the cost of the census under the act of March 3, 1879, to \$3,500,000. While the cost of the census according to the scale of 1870, after allowing for an increase of 30 per cent. in population and other elements of cost, would be \$4,333,333. The superintendent concludes by saying that should it be the decision of Congress not to allow the additional amount asked for, he will use his utmost endeavors to bring the expenditures within the original limit of the law, by stopping all the special investigations not made absolutely obligatory upon the office, and reducing the compilations to the narrowest limit.

The Hardware Board of Trade and the Navigation Laws.—At a meeting of the directors of the Hardware Board of Trade, held at Nos. 4 and 6 Warren street on December 7, the following resolution was adopted: That the Hardware Board of Trade of the city of New York urge upon the attention of Congress the pressing necessity of such legislation as shall remove the obstacles that have so nearly destroyed our carrying trade with foreign nations. That we believe experience has demonstrated that our present navigation laws are so ill adapted to the altered condition of the shipping interests that they hinder rather than help our commercial marine. That the better results which have followed the course of other maritime nations in allowing the free purchase of ships by their subjects and admitting them to registry with all the rights of native-built ships has satisfied us that the same policy would be not only safe, but highly beneficial to our shipping interests, and we, therefore, urge upon Congress the passage of a law allowing our shipping merchants to buy their ships wherever they can get them cheapest in the markets of the world, and admitting such ships when they become the property of American citizens to the same registry and privileges as the ships of American build.

The sudden departure for St. Petersburg of Herr Krupp, of the famous Essen Works, near Cologne, has excited a great deal of speculation in Germany. A perfect arsenal of weapons has been for several months in process of construction at Herr Krupp's establishment for the Chinese government, and all the entreaties of the Czar's ministers have not availed to induce Prince Bismarck to interfere in the matter and prohibit their exportation, so it seems probable that the great gun maker is to be bribed or coaxed or threatened into giving up the contract. He has supplied Russia with guns and rails for many years, but some of his latter transactions with the Holy Empire have not been concluded without wrangles, and as he is now comparatively out of favor at St. Petersburg, it will require very strong inducements to lead him to throw over his Celestial clients.

The Iron Age

Metallurgical Review.

New York, Thursday, January 13, 1881.

DAVID WILLIAMS, Publisher and Proprietor.
JAMES C. BAYLES, Editor.
JOHN S. KING, Business Manager.

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RATES OF ADVERTISING.

One square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$45.00; payable in advance.

DAVID WILLIAMS, Publisher, 83 Reade Street, New York.

PHILADELPHIA.....220 South Fourth Street.
THOS. HOBBS, Manager.

PITTSBURGH.....Fourth Avenue
JOS. D. WELLS, Manager and Associate Editor.

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The Supreme Court of the United States has made a decision in the case of the Memphis bondholders which is of considerable importance. It has virtually decided that the security of a city bondholder does not extend beyond the life of the corporation that made the debt; that neither the property of the city nor of its inhabitants can be held responsible for its debts after the corporation has resigned its powers to the body that gave it birth—the State. The Supreme Court, in other words, has provided for a process of bankruptcy through which a city can pass to relieve itself of debt when the burden becomes too great, and that is by terminating its corporate existence. This leaves the bondholders judgment creditors of the defunct corporation. On three points raised the Supreme Court held unanimously: First, the public buildings and water works of the city are not liable to attachment for a

debt. They can only be used for municipal purposes, and revert to the State when the city corporation dissolves. Second, the private property within the city is not liable for its debts, except as it can be reached by taxation. Third, taxation for this purpose can be levied only by the legislative authority, not the judicial. The condition in which this decision leaves the rights of the bondholders on the back taxes still uncollected is not clear; but, as far as the present proceedings are concerned, the bondholders have to begin again *de novo*.

The Progress in Metallurgy During 1880.

In a future history of metallurgy the year 1880 will not be placed on record as having witnessed revolutionizing changes in the methods employed in the manufacture and manipulation of the metals. Yet the progress realized has been very marked and substantial in many departments. Probably the condition of the trade has a controlling influence upon the direction which the efforts of those connected with the industry takes, and the events of the past year certainly appear to bear this out. Pressed by an unusually heavy and sustained demand, the managers of our iron and steel works have strained every nerve to increase the capacity of their respective establishments. Their efforts have been crowned with success to a degree which even the most sanguine might have refused to credit only a year ago, and Americans may justly be proud of the fact that in almost every department our own works have outstripped their rivals in foreign countries. There is something marvelous in this development, which reflects the highest credit upon the ingenuity and skill, not alone of those who planned and operated the works, but also of the workmen.

The increase of capacity has been most striking in the working of the Bessemer process, and we may turn to it first in a brief survey of the achievements of the last year. An output of 3000 tons of ingots per week with two vessels has been repeatedly attained, and may be looked forward to as the average output at an early date. At present the only available figures for the production of one mill for the year 1880 are those of the Edgar Thomson works, whose record is as follows:

	Tons.
Ingots.....	173,203
Rails.....	100,094
Merchant steel.....	4,263
Total product.....	194,357

Besides the 22 converters of the eleven old mills in the country, the following additions are completed and have been partly producers in the last year, and are likely to add to the production during the whole of the coming year—three new converters at Harrisburg, two at Bethlehem and two at Pittsburgh. Other works are in course of construction and are being planned. A special feature in connection with two of them deserves particular mention. Both are to be built in accordance with Mr. A. L. Holley's new system of removable shells, recently illustrated and described in *The Iron Age*. The leading idea in the adoption of the new system was to make them available, if necessary, for the basic process, a wise provision, as the new plan, while it would be indispensable to the maintenance of a high production by the Thomas process, would offer valuable facilities, though in a smaller measure, for the ordinary Bessemer process also. The North Chicago Steel Company, whose new blast-furnace plant we illustrated recently, intend to put up a plant of three 10-ton converters with removable shells, placed around one pit, intermediate cranes being used to transfer the steel to the ladle. It is believed that a capacity of 200,000 tons of ingots will be obtained. The Joliet Company are building two 10-ton converters with Holley's removable shells, which, it is estimated will be capable of producing from 173,000 to 200,000 tons of ingots per annum. While thus some of the works favorably located for the working of impure pig are wisely making provisions for the future, no actual trials of the basic process have been carried out in this country, and we must look to England and Germany for the latest developments.

We have closely followed the progress made abroad during the year, and need therefore, at the present time, hardly do more than summarize what has been written from time to time. A great number of careful analyses made by well-known and disinterested chemists, have placed the fact of complete dephosphorization beyond all doubt, and it seems that, if kept within reasonable limits, sulphur need not be feared. The great discovery of the year has been that silicon, which had been until then thought indispensable for furnishing the necessary heat by its combustion to carry through the process, may, within certain limits, be supplanted by phosphorus itself. By reducing the quantity of additions necessary and the wastage, this discovery placed the basic process in a new phase. The only obstacle to be overcome was the comparatively limited duration of the lime lining, causing, together with a reduction of the capacity of the vessels, a curtailment of the production. A number of arrangements of the plant of a Bessemer works were suggested and carried out, prominent among which are those of Mr. Richards at Eston, and of Mr. A. L. Holley, both of which have been brought to the attention of the readers

of *The Iron Age*. The basic process has already been regularly established in a number of German, French, Belgian, Austrian and English works, and it is likely that special circumstances will ultimately lead to its use in certain localities here. Thus far the mechanical properties of the metal produced by the basic process have been satisfactory, but the experience gained in actual use can only be regarded as the final decision. It has been held by some of the most eminent metallurgical authorities of Europe, that the manufacturers of puddled iron must look to this new process as their most dangerous competitor. The question of the substitution of steel for iron for many ordinary purposes must, however, rest in abeyance until users, on the one hand, have learnt to adapt it to their purposes, and producers, on the other hand, have found the means of making a metal which can be welded with ease.

The manufacture of open-hearth steel is rapidly gaining ground, both as to the bulk of metal produced and as to the favor with which the steel made is received. Important additions to the existing plant have been made during the year, and quite a number of new furnaces are in course of erection or are contemplated. The most notable improvements introduced during the year have been two processes for furnishing suitable and cheap raw materials. The Krupp washing plant has been in successful operation at the Springfield works, where, however, some inconvenience has attended the handling of the metal. The plant at Bethlehem is approaching completion. The experiments with the Siemens direct process for making sponge for direct use in the open-hearth furnace have been so encouraging that four rotators, having a total capacity of 1000 tons per annum, are being built at Pittsburgh.

Among the other methods of producing steel, we would note the rapid expansion of the manufacture of steel castings for parts of machinery and many other purposes, in which quite a number of works using special processes are now engaged. The Wheeler process of rolling melted steel scrap in a casing of wrought iron has, we learn, stood a series of practical tests with such favorable results that the manufacture of sheets and plates, chiefly for shipbuilding purposes, has been commenced on a working scale at Chester, Pa.

In the puddling of iron little progress has been made during the year. Successful efforts have been mainly directed to a lowering of the enormous consumption of fuel, prominent among which is the introduction of the Bethlehem furnace. The McDonald shield, for relieving the workmen of much of the suffering attending the puddling process, is an improvement which must not be underrated, and the reports received of its working speak well for its continued use. The Danks mechanical puddling furnace is again attracting attention, and it is reported that a new mill is being built under the supervision of the inventor himself, while Mr. John Williams, of the Millvale Works, Pittsburgh, has again put on record the favorable results obtained with it.

In rolling mill practice, little that is new can be recorded. English engineers have lately taken much pride in pointing to the fact that some of the works in Great Britain, after being for a long time behind our achievements, have succeeded in outstripping their American rivals. We are in a position to state, however, that in the near future the lead will be again taken on this side of the Atlantic. There is now in course of construction, at the works of the North Chicago Steel Company, a rail mill which, with a three-high 36-inch roughing train and a 24-inch reversing finishing train, will roll 12-inch ingots direct into rails of double and treble lengths. A notable feature in modern American rolling-mill practice is the rapid adoption of high-speed engines, notably of the Porter-Allen type. In this connection we may also mention the important step taken by Messrs. Park Brothers & Co., of Pittsburgh, in building a 17-ton hammer for making large forgings.

The most important progress characterizing the management of blast furnaces during the year, has been a further increase of their output. The Lucy and the Edgar Thomson, furnaces, at Pittsburgh, with good ores, excellent fuel, high heats, &c., have carried their output to figures never even reached before. While these are the most striking examples, there are many stacks throughout the country which have made remarkable records, taking into account their size and the character of their ores and fuel. Fast driving has become a policy quite generally accepted, and our managers have learned to combine it with great skill in producing the exact metal required; in fact, there seems to be little difficulty now in making a pig of a certain chemical composition to order. During the year it has become a recognized fact that no modern blast-furnace plant is complete unless supported by a hot-blast stove, either of the Whitwell or the Siemens-Cowper-Cochrane type. A large number of both have supplanted older iron stoves in existing works, and nearly every new furnace erected has been similarly provided, even charcoal furnaces beginning to adopt the new system, to the introduction of which the large output realized is principally due. There is, however, much room for improvement in the types of blowing engines of our blast furnaces, and it is in this direction that progress in the early future lies. Of minor improvements, we would cite the

efforts made to prepare ores for smelting by preliminary roasting, and it is in this connection that we would again call attention to the Taylor kiln, and to the interesting series of experiments made with the Westman kiln at Katahdin.

In the burning of fuel for metallurgical processes, little progress has been made during the year. The use of gaseous fuel has not yet conquered that place to which its great advantages entitle it, nor have any striking novelties in the construction of producers been brought forward. The water-gas processes have rested during the year, and it seems that the discussion of the subject has been transferred from this country to Germany and Sweden, where much agitation is going on in metallurgical circles.

Beyond a steady advance, mainly directed to the elaboration of detail, only few novelties likely to prove of permanent interest have been brought out in the metallurgy of copper, lead, zinc, silver or gold. Some experiments on a large scale have been conducted at Rio Tinto with a new German process for the extraction of copper and silver from low grade pyrites, and at Lautenthal, in Germany, a new and ingenious process for the working of rich silver-lead-zinc alloys, obtained in lead desilverization, has been introduced by Herr Schnabel.

On the whole, therefore, the improvements made have been satisfactory. They show that many intelligent and energetic men are earnestly seeking every means of cheapening their product and improving its quality, and give promise of an uninterrupted and steady progress in the year now before us.

Condition of the Blast Furnaces of the United States, January 1, 1881.

Through the prompt attention of our correspondents in various parts of the country, we are enabled to present our readers the record of the condition of the blast furnaces at the beginning of the year, a week in advance of the usual time. We take this occasion to acknowledge the obligations we are under to these correspondents, and to express the hope that we shall still receive their aid in our endeavor to furnish frequent and reliable reports of the condition of the blast furnaces of the country. In order to avoid any misunderstanding, and to point out exactly the scope of the table, the following explanations are given:

1. The divisions of the localities are geographical for the most part, and are not made with reference to the points from which furnace supplies are drawn. 2. The columns "in blast" and "out of blast" only show the stacks from which we have reports, and their footings will not equal the footings of the column of total number. 3. We have included some furnaces that are rebuilding and not yet completed, and others that are building, and in one or two cases some furnaces that have been reported abandoned, since their owners do not report them. In other cases we have stricken from our list furnaces that are generally included in such lists, as we are assured that they are permanently out. 4. The column of capacity per week is somewhat in excess of what the regular working of the furnace will show—stoppages, slow working and various other causes, which will readily occur to those interested, combining to reduce the make below the furnace capacity.

In a condensed form the table shows the following:

	In blast.	Out of blast.
Charcoal.....	160	112
Anthracite.....	162	76
Bituminous.....	151	68
Total.....	473	256

One of the most marked features of this report is the large number of charcoal furnaces reported in blast. This is usually the season of the year when these furnaces blow out for repairs, or in accordance with a belief that short blasts are better for charcoal furnaces. This year is an exception to the rule. The chief reason for this is doubtless to be found in the heavy demand for C. B. charcoal iron, arising from the great demand for car wheels. We have already spoken of the large number of wheels that will be made this year in the West, and irons that have been used but little in their manufacture heretofore are entering into their composition as mixtures, while the standard brands are largely sought. This is certainly a change from five or six years ago, when it began to be feared that charcoal irons would never again be in great demand. Bessemer mills found that these irons were not necessary to good product, and coke and anthracite irons were supplanting charcoal for many purposes. This is changed now, and charcoal irons are in great demand.

Another important feature of this report is the marked increase in the capacity of the furnaces, and the fact that it is these furnaces of large make that keep in blast.

The relative condition of the blast furnace industry for the past seven years is shown in the following condensed table of furnaces in and out of blast on the first days of January, 1875-81:

	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Charcoal.....	259	95	71	79	93	150	112
Anthracite.....	130	100	87	98	66	163	76
Bituminous.....	81	98	84	86	82	156	68
Total.....	363	293	244	263	241	369	256

	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Charcoal.....	145	166	209	189	180	146	112
Anthracite.....	87	125	136	128	132	127	76
Bituminous.....	96	109	123	138	123	150	68
Total.....	328	400	468	455	435	423	256

It will be seen from this table that the number of charcoal and bituminous furnaces in blast is greater than at any date covered by the table, while the number of anthracite is less this year than last.

To make the changes more evident, we subjoin tables showing the percentages of the whole at different dates:

	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Charcoal.....	51	34	30	30	39	39	59
Anthracite.....	60	40	39	43	43	71	68
Bituminous.....	46	47	41	39	40	61	70

	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Charcoal.....	49	66	74	71	79	61	41
Anthracite.....	40	60	61	57	57	72	33
Bituminous.....	54	53	59	61	60	39	26

The Liability of Corporations for Accidents.

A case of more than usual interest in its bearings upon the extent of the liability of corporations for accidents, has just been decided by the Supreme Court of Pennsylvania. The case was the suit of two workmen, named Newberry and Kennedy, against the Keystone Bridge Company at Pittsburgh, to recover damages for injury received during the construction of a roof at the bridge company's works. The jury in the lower court awarded the men damages. The company took the case to the Supreme Court, which has reversed the action of the lower court.

To understand the reason of this reversal some explanation is necessary. The plaintiffs were laboring men, working under direction of Wm. Wymond in placing an iron roof on the building. A trussed plank was used in placing the roof. While a rafter was being carried on this plank it gave way and the men were thrown to the ground. The question on which the case turned was the extent and character of the authority Wymond, who had charge of the men who were doing the work. Wymond did hire or discharge men, and they were, for the time being, under his direction only because they had been sent to him by Mr. Robinson, the general foreman of the works. Wymond was, in effect, a "gang boss." The court, in commenting on this phase of the subject, says: "There was no contradiction of the testimony to the effect 'noted, and it establishes in the opinion of the court that Wymond was in no manner the general representative of the company, or clothed with its powers. He simply had charge of a gang of men furnished him by another who was his superior, and whose orders he was required to obey. Wymond was employed in putting up a ventilator, and while thus employed was a workman with the other men. It was testified that Wymond, Matthews and Krekeler had made the trussed plank which gave way and caused the accident. The Court says that Wymond and the others were all engaged in one common pursuit and seeking to accomplish one common object, and that all of them were subject to the orders of another who was their superior in command."

After quoting the authorities on the relations of employers and employed, the Judge says: "We are clearly of opinion that Wymond, upon the undisputed testimony in the case, was not such a representative of the defendants as that they would be liable for his acts of negligence. The injuries of the plaintiffs, it is claimed, were occasioned by the breaking or giving way of a defective apparatus. Now, this apparatus was not furnished by the company at all. It was made by Wymond and two others of the workmen, and if it was defective it was the negligence of three fellow workmen of the plaintiffs. No superior officer of the company gave orders that the particular materials used should be selected, or that the particular contrivance itself should be constructed. The workmen made such an apparatus as they deemed sufficient. If it proved insufficient it was an error of judgment on their part, for which we can see no ground of liability as against the defendants for the injuries of the plaintiffs."

This decision establishes the principle that all men who may be in charge of workmen do not sustain such relations to the employer that injuries received by workmen while under their direction will necessarily make the employer responsible, but that, on the other hand, the man in charge may be a workman among workmen only.

As this case has been remanded for a new trial, some interesting points will, no doubt, be brought out. The Court, in commenting on the evidence and its omissions, stated that there was no testimony given as to whether the truss was too heavily laden or if it was made of defective material, nor is there any evidence that there was a flaw in the iron, nor is it clear that the wood was too weak to sustain all the reasonable weight upon it.

Should testimony on these points be offered, it will raise another question different from the one decided. If the material furnished was lacking in strength or suitability, the company may be liable if they furnished it; out here again, under the ruling of the Supreme Court, if the workmen selected themselves there could hardly be any liability.

Capt. Eads seems to be making excellent progress with his Tehuantepec ship railway project. As is elsewhere noted in our columns, he has obtained the most liberal concession ever granted by the Mexican

government, and is authorized to place the work under the protection of the United States government. The plan is one which is no doubt practicable, and it is not quite as safe to quarrel with Capt. Eads' estimates of cost as it is with those of M. Lesseps.

Restricted Immigration.

The recent letter of Consul Byers, of Switzerland, on the subject of restricted immigration to the United States, raises a question which, while it is by no means a new one, is destined to be an important one in the near future. One phase of the question, Chinese immigration, has assumed a national importance already, and has been an issue in a Presidential election. There are now in our immigration laws provisions against the coming in of paupers and criminals, but they are not enforced with much care, and only in flagrant cases. There are parties who are discussing the propriety of permitting agitators and persons who are regarded as inimical to the existence of certain governments, to be exiled to this country without limit and restraint, here to become professional agitators. It is reported that the Department of State has already received protests against the letter of Consul Byers, and that he has been reprimanded for writing it.

There are indications, however, that the question will not down, and that with respect to the particular question in which our readers are especially interested—the industrial one—the next few years will hear a good deal of discussion. It is a well-known and avowed object of many, if not all, of our trades unions to limit the number of workmen by rules or customs that prevent outsiders from learning trades. In the iron trade the puddlers can only teach their sons; the nailers the same. In other trades similar restrictions exist. Now, it is evident that these will not have the effect intended, unless, at the same time, some means are taken to stop foreign workmen from coming here, and it is no secret that such steps are being taken. The window glass blowers will not permit a foreigner to join their union until he has been here a certain length of time—six months, if we remember rightly. They have also sent a delegation to Belgium to prevail upon blowers not to come to this country, and attempts have been made by other trades to form such connections with English and other unions as should regulate the immigration of workmen.

But all this will not avail, and the question of restricted immigration is being agitated, not very openly yet nor very decidedly, but the indications are sufficient to show that it is a subject attracting thought and attention. We have already published the resolutions of several trades assemblies on this subject. No one could have read the labor papers during the recent election and since, and not seen in them a latent intention of making this question of immigration an issue in the near future.

Whether any good will be accomplished by this agitation remains to be seen. There is no doubt but some restrictions will be thrown around immigration. Consul Byers proposes the passport system, so that no alien shall be allowed to land unless he has a certificate from some American consul establishing the fact that he is neither a convict, a fugitive from justice nor a debtor; that he is able-bodied and has means for self-support. This may be feasible, but to say that because a man is a puddler or glass-blower or weaver he shall not come to this country, is too much of a piece with the restrictions thrown around the immigration of skilled workmen from England early in this century.

The United States Trade Mark Association have undertaken an important and useful work, in which they should have the encouragement and support of all who are in any business in which trade-marks are valuable property. The offices of this association are at 165 Broadway, New York, and manufacturers using trade-marks would do well to put themselves in communication with Mr. Forbes, the secretary. As yet our laws have not fully recognized the property right which exists in trade-marks, nor can this right be adequately protected. A bill on the registration and protection of trade-marks is now pending in Congress, having passed the House on the 27th of April, 1880, and reached a second reading in the Senate. Copies of this bill may be obtained from the association, where any suggestions looking to the amendment of the act may be sent.

Death of Charles T. Bunting.—Charles T. Bunting, of the firm of E. G. Blakelock & Co., iron merchants, at 80 Centre street, died on Monday evening at his home, 216 East Twelfth street, in his 77th year. Mr. Bunting was a native of Philadelphia. He moved to New York while a young man, where he led an active business life for half a century. He was, prior to 1865, a contracting builder, and he erected the Bowery Savings Bank and other well known structures in the lower portion of the city. For 15 years he had been a member of the iron firm in which he was still interested at the time of his death. He was a member of the Society of Friends. He leaves a wife and three daughters.

Analysis of Leadville Ores.—An analysis of an average sample representing 1000 tons of ore, comprising the product of every mine in the district, was made some time since. The result, published in the *Engineering and Mining Journal*, shows that Leadville ores contain, in the proportion named, the following ingredients:

	Per cent.		Per cent.
Carbonic acid.....	5.38	Lime.....	2.36
Oxide of lead.....	25.77	Magnesia.....	3.04
Silver.....	.31	Arsenic.....	.01
Silica.....	22.50	Antimony.....	.02
Sulphur.....	.90	Potash and soda.....	.98
Protoxide of iron.....	.89	Chlorine.....	.09
Sesquioxide of iron.....	24.86	Moisture.....	5.58
Peroxide of mang.....	4.03		
Alumina.....	3.99	Total.....	101.00

There were also traces of gold, copper and zinc which could not be weighed.

WASHINGTON NOTES.

Tariff Matters in Congress—Foreign Trade—Iron Ore Importations.

(From Our Own Correspondent.)

WASHINGTON, D. C., January 12, 1881.

The irrepressible Frank Hurd, of Ohio, who will be *functus officio* after March 4, made an effort in the House last Thursday, January 6, to get his Cobden Club "enunciation of principles" for the establishment of free trade in the United States out of committee for discussion. He not only did not make much of a show of success, but the Democratic leaders very plainly let him understand that they were not agitating the free trade question as much as when they went into power four years ago. Thomson, Fernando Wood and other anti-tariff men are quite emphatically opposed to any agitation of the question until they once more recover their bearings, and see where they stand as regards public sentiment.

Mr. Townsend, of Illinois, one of the most ardent tariff men, and only excelled in this by his faith in the Democratic party, said to your correspondent that the Democrats of the House would not permit the Hurd resolution to pass, nor would anything be done at this session, and, in his opinion, Democrats would be rather chary of again attempting an aggressive course on free trade. He thought that the tariff issue alone defeated the Democratic party at the last election, and no more tariff tinkering would be indulged in for some time to come. He thought that the people would have to be educated up to this question. Mr. Carlisle, of Kentucky, of the Committee of Ways and Means, on the other hand, says that the Hurd resolution will be reported, but not in the shape submitted by him, and that there will be a minority report. Speaker Randall again has given his disapprobation of the Hurd resolutions, which may stimulate the aversion of the Democratic leaders for any free-trade agitation just now and check the whole movement.

The determination of Senator Blaine to accept the position of Secretary of State in the Garfield Cabinet has rather disconcerted the tariff men, as it will in all probability take Frye, their candidate for Speaker, out of the House and place him in the Senate. The friends of Mr. Kasson are now publishing him as an ardent tariff man. Gentlemen who served on the Committee of Ways and Means with him say that he was always one of the most aggressive of free traders. A statement of his course on this subject has been partially completed with the following results: On the Tariff Act of June 30, 1864, to increase the duties on imports and for other purposes, after speeches by Morrill and Thaddeus Stevens in support of the bill, and Cox of Ohio and Wood of New York against it, in the vote, Mr. Kasson voted for the bill, it being conceded by him that the question was not one of protection, but of revenues to meet the extraordinary expenses of the war. On the tariff act of 1855, which was a measure amendatory of certain acts imposing duties on foreign importations, when the vote was taken—on a motion to lay the bill on the table—the protectionists voted against the motion. Mr. Kasson's name appears among those not voting. On the tariff act of 1866 to protect the revenue and for other purposes, on the passage of the bill, Mr. Kasson was on the list of 59 gentlemen not voting. Among these were also Messrs. Schenck and E. B. Washburne.

In an abstract of the annual report of the Chief of the Bureau of Statistics on the foreign commerce of the United States for the year ended June 30, 1880, is shown the relative importance of the exports of five of the leading commodities from the United States. During that time the value of these amounted to \$691,258,298, or 83.9 per cent. of the entire value of exports of domestic merchandise—standing as follows: 1. Bread and breadstuffs. 2. Cotton and manufactures thereof. 3. Provisions. 4. Mineral oil. 5. Tobacco.

The first authoritative data respecting all the above exports dates back to 1821. That relating to mineral oils begins in

* The returns for these two years are incomplete.

The report also gives some interesting aggregate and comparative information respecting other articles of domestic production exported from the United States:

	1870.	1880.	Per cent.
Mineral oil, illuminating, gals.....	97,000,505	357,325,893	275.2
Pinto, value.....	\$20,664,193	\$31,793,575	64.4
Locomotives, No.....	45	50	140.0
Pinto, value.....	\$341,794	\$46,313	36.5
Iron and steel and manufactures.....	\$13,483,163	\$14,716,594	110.3
Met. and mfrs. not elsewhere specified.....	\$40,872	\$270,679	\$509.827

Imports of articles named into the United States:

	1870.	1880.	Increase.
Iron and steel and manufactures.....	\$32,665,454	\$53,714,008	\$21,048,554
Iron and steel and manufactures.....	\$9,447,148	\$53,714,008	\$44,266,860

This shows an increase in the values of imports of 1880 over 1870 of 48.6 per cent. Value of imported and entered for consumption during the year ended 1880, iron and manufactures alone, \$34,318,513.68. Duties, \$14,103,315.24—41.1 per cent.

The Chief of the Bureau of Statistics has just completed, and will issue early next

CONDITION OF THE BLAST FURNACES OF THE UNITED STATES, JANUARY 1, 1881.

(Compiled for The Iron Age.)

Location.	CHARCOAL.				ANTHRACITE.				BITUMINOUS OR COKE.			
	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.
New England.....	17	13	1,045	4	230	1	1	160	0			
New York.....	10	12	809	4	239	42	34	7,480	8	1,720		
New Jersey.....						18	12	3,185	6	1,300		
Spiegel.....						3	1	50	2	82		
Pennsylvania.....	38	29	1,461	9	371	51	35	9,284	16	4,050		
Lehigh Valley.....						50	29	5,575	21	3,900		
Schuylkill Valley.....						25	13	2,846	12	1,765		
Upper Susquehanna Valley.....						42	33	5,650	9	1,270		
Pittsburgh.....											15	10
Allegheny Valley.....											4	428
Shenango Valley.....											32	12
Youghiogheny Valley.....											6	5
Junata and Conemaugh Valley.....											26	17
Maryland.....	15	9	562	6	340	5	4	615	1	100	4	1
Virginia.....	30	15	643	15	680	1	0		1	140	8	8
North Carolina.....	7	0		7	264						1	1,335
West Virginia.....	6	1	100	5	407						6	6
Ohio.....											17	13
Mahoning Valley.....											23	19
Eastern, Central and Northern.....											14	11
Hocking Valley.....											17	10
Hanging Rock.....	31	25	2,314	6	480						10	1,715
Miscellaneous.....	3	0		3	268						4	3
Kentucky.....	10	4	548	6	490						8	5
Hanging Rock.....	8	2	170	6	450						3	2
Western region and Miscellaneous.....	19	7	536	12	785						3	5
Tennessee.....	8	5	380	3	78						4	4
Georgia.....	12	0	1,110	4	390						3	1
Alabama.....	1	0		1	140						13	9
Indiana.....	27	17	3,271	10	2,030						1	0
Illinois.....	11	9	1,096	2	245						3	3
Michigan.....	1	1		0							8	8
Wisconsin.....	12	3	660	9	1,350							
Minnesota.....	1											
Missouri.....	1											
Texas.....	1											
Utah.....	1											
Oregon.....	1											
Total.....	275	160	14,708	112	9,236	238	162	34,345	76	14,327	229	151

week, a valuable table, showing the quantities and values of iron ore imported into the United States for the periods indicated, with the countries whence it comes. This is an entirely new branch of statistical inquiry by the government, and is intended to supply much-needed information to the iron industry of the United States. The Chief of the Bureau of Statistics has for some time been in receipt of special inquiries on this subject by a number of leading iron establishments, miners and consumers of domestic ores, and to fully and authoritatively answer these inquiries this table has been prepared. It may be further stated that the article "iron ores" has been placed on the permanent schedules of the bureau, and in the future will be reported at regular intervals.

The following is the complete table, taken from the manuscript copy which will shortly be sent to the printer:

IMPORTATIONS OF IRON ORE.

Countries.	Year ended June 30, 1879.	Year ended June 30, 1880.	Five months ended Nov. 30, 1880.
	Tons.	Tons.	Value.
Brazil.....	279	800	
France.....	2,020	3,364	
Germany.....	5,141	11,476	
French West Indies.....	200		
French Possessions in Africa and adjacent islands.....	31,727	113,222	47,324
Germany.....	4,697	10,329	
England.....	18,488	79,319	26,350
Scotland.....	323	0	
Ireland.....	5,867	12,161	5,065
Quebec, Ontario, Manitoba and the North-western Territory.....	3,924	30,297	23,260
British Columbia.....			400
British Possession, all other.....	922		
Italy.....	9,008	20,484	54,440
Portugal.....	8,234	1,121	2,941
Spain.....	80,044	131,807	91,858
Venezuela.....			100,934
Africa and adjacent islands.....			2,500
Turkey in Africa.....	1,800		7,791
United States of Colombia.....			1,000
Venezuela.....			209
Total.....	150,821	425,012	253,254

The value of the 150,821 tons imported during the year ended June 30, 1879, is given at \$343,034, while that of the year following was \$1,192,961.

METALLURGICAL NOTES.

OPEN-HEARTH STEEL FURNACES.

Reports from England state that the Price report furnace is doing very well at the Woolwich Arsenal for heating an open-hearth steel furnace, while the Bicheroux furnace has been operated with success in connection with the same process in Germany.

THE TREATMENT OF COMPLEX ZINC AND LEAD ORES.

The latest of the numerous proposals made for the treatment of complex zinc and lead ores, which have, until now, defied all profitable working, comes from Mr. Ed. A. Farnell, who has described his method, adopted at the works of the Swansea Zinc Ore Company, before the British Association. After grinding and screening, he roasts the ore in a muffle furnace at a dull red heat, and then extracts the sulphates and oxides of zinc thus obtained with the aid of sulphuric acid. The solution of sulphate of zinc is deprived of its copper, and is then boiled down until it begins to thicken. Then finely ground blende is mixed in the proportion of one equivalent to three equivalents of sulphate of zinc. This mixture, after being dried, is heated to redness in a muffle furnace, whereby oxide of zinc and sulphuric acid are formed, much in the same way that similar reactions take place in the hearth and reverberatory

lead processes. The oxide of zinc is a good raw material for the manufacture of spelter. The residues from the extraction with sulphuric acid are smelted for lead and silver in the usual way.

THE PRECIPITATION OF COPPER BY IRON.

At Schmollnitz, Austria, as at many other places, the water from the mine contains small quantities of copper, besides larger amounts of sulphate of protoxide and peroxide of iron. This copper, which varies in quantity from 0.38 to 0.55 grams per liter, is partially regained by precipitating it with iron. Owing to the presence of sulphate of peroxide of iron, which is reduced to the protoxide salt, the quantity of iron required is far above that theoretically required for the precipitation of the copper, the average amount used being 389 pounds for every 100 pounds of cement copper obtained. With the purpose of diminishing this heavy expense, Dr. St. Schenck has conducted a series of experiments on a small scale which give promise that an important economy will be effected. He mixes the iron with pieces of coke, which has the effect of intensifying the action of the iron, accelerating the precipitation, preventing to any considerable degree the reoxidation of sulphate of peroxide of iron already reduced, and yielding a purer cement copper. While formerly 33 per cent. of the copper was lost in the waste waters, nearly the entire amount is now precipitated, and the experiments indicate that the consumption of iron has fallen from nearly 400 to about 300 pounds per 100 pounds of cement copper.

Basic Linings Used in the Conversion of Cast Iron into Cast Steel.

To the Editor of The Iron Age.—DEAR SIR: In view of the probable early adoption of calcareous linings for converters and furnaces used in the production of cast steel from phosphoric cast iron, the following may be of interest: The erroneous impression has got abroad that steel can be produced from phosphoric cast iron by the use of these linings alone. The fact is that they have only been employed successfully in conjunction with basic reagents and a modification of the process, without which they are of no practical use. In the steel processes, they are more costly than the ordinary silicious linings. This has been often shown by the reports on the Thomas-Gilchrist process, read at the meetings of the British Iron and Steel Institute during the past 18 months, from which it is evident that first lime and ore, and later, lime alone, are used in the converter to absorb the silica and phosphoric acid. Besides, they must be used in combination with the after-blow, invented by Thomas—a necessary feature, as the phosphorus does not leave the metal in this process while any carbon is present. All the published analyses prove that the carbon must be first eliminated and the metal afterward blown for from one to three minutes, in order to oxidize the phosphorus and carry it into the slags. Thus in this process it is a combination of a basic lining with additions of lime and the after-blow, that insures dephosphorization in the Bessemer converter. Neither, used separately, nor any two of them, will effect this object.

The analyses in the report on this process, read by Mr. C. B. Holland and A. Cooper, at the meeting of the British Iron and Steel Institute in May last, confirm this:

	At the drop of the carbon flame.	At the end of the after-blow.
	Per cent.	Per cent.
Blow 1-8 phosphorus.....	0.893	0.059
Blow 136 phosphorus.....	1.092	0.044
Blow 166 phosphorus.....	0.892	0.081

Previous to the invention of the after-

blow, the phosphorus had been removed, in a process similar to the Bessemer, by use of my fluorine process in Du Motay's horse-shaped converter, lined with the magnesia bricks. The manufacture of these bricks was described by Caron in *Dingler's Poly. Journal* in 1868. Du Motay also took out an English patent in 1868 for apparatus for converting crude iron into cast steel, in which he specified magnesia or alumina for the linings. His apparatus consisted of an open-hearth furnace, a puddling furnace, with an oscillating bed, and a horse-shoe-shaped converter, into which air was blown like in the Bessemer process, and in which oxides and silicates of iron and manganese were forced through the metal from the bottom upward. In the early part of 1872 he substituted fluorspar for the silicates, thus using my process, and obtained steel from cast iron containing 0.65 per cent. of phosphorus; although a portion of the carbon was left in the metal, the phosphorus was entirely removed. Thus, it appears that the use of fluorspar enables the production of cast steel by partial decarbonization, while with the use of lime the metal requires complete decarbonization, and a subsequent process of oxidation, called the "after-blow," before the phosphorus is removed in the Bessemer process.

My patent of August 16, 1870, No. 106,365, specifies the use of basic linings—lime, magnesite, magnesia, magnesian lime, and magnesian limestone in my process of using fluorspar and oxides. We have here, therefore, the basic lining and the use of a basic mixture claimed by subsequent inventors. Du Motay had the basic lining, but he used silicates, and he did not claim that he could dephosphorize iron by their use, while I claimed basic reagents, and also obtained a British patent in 1870 for the use of oxide of iron linings for furnaces, in which my process for purifying cast iron for foundry use and for steel and iron manufacture was conducted. This was successfully applied at the Bowling and the Chillington Iron Works, England.

The chemical operation of my process is the reverse of that of the Thomas; in mine the dephosphorization takes place simultaneously with the decarbonization, as will be seen by the following analyses made by Mr. E. Riley and Dr. Noad:

	Carbon.	Phosphorus.
	Per cent.	Per cent.
Pig iron.....	2.92	0.89
Purified metal after 10 minutes.....	2.38	0.06
Steel after 30 minutes.....	1.38	0.04

In other steel processes where fluorspar is not used, the phosphorus will not leave the metal while carbonic oxide is being formed, or while the metal is undergoing decarbonization.

By the use of fluorspar instead of lime, steel can be produced without the aid of manganese or ferro-manganese when the pig iron contains from 0.50 to 0.75 per cent. of manganese, as a portion of the latter does not leave the metal until after all of the carbon is removed. This saves not only the difference of \$1.25 per ton of steel for cost of spiegelisen, but also a large part of the waste incident to the Bessemer process. This fact is well established in Sweden, where, when steel is made in the Bessemer process by partial decarbonization, it ranges from 9 to 15, or an average of 12 per cent. Thus at least \$2 per ton may be saved by use of fluorspar as compared with lime. Besides this, the slags of the process—nearly half a ton in either case—are available for smelting as iron ore when fluorspar is used, as they "wash" the iron without being sensibly contaminated with the silica and phosphorus, which pass out as vapor. With lime the slags are not as valuable, as they contain the impurities of the metal and some of the waste of iron. The difference in the value of the slags will more than compen-

rate for the extra cost of fluorspar over lime and the preparation of the materials for my process, so that there is apparently a clear gain of \$2 per ton from the use of fluorspar when the iron contains 0.50 per cent. of manganese.

A great deal has been written and said about the priority of invention of basic linings, but very little, if any, mention has been made of Leon Talbot's British patent No. 370 of 1857 for use of chalk (which is carbonate of lime), iron ore, or a mixture of both as a lining for a converter, in which the Bessemer process is used for refining iron, for puddling, and also for the production of iron and steel. I hold that this is the basic lining used in the Bessemer converter and process, and in proof of the fact, that it was at one time so considered by Thomas. I would point to the circumstance that it is also specified by him in his English patent of 1877, No. 4422, as one of the agents he uses. He specifies magnesia, lime and chalk, two of which are specified by Talbot and Du Motay in 1857 and 1868 respectively, and magnesia lime by me in 1870.

Thus it appears that the basic lining with the inner basic lining was invented by me in 1870, and was successfully applied in the Bessemer and reverberatory furnace process for the production of steel by partial decarbonization, and that the claim to the invention of basic linings only belongs to Talbot, and that Thomas' invention consists of a combination of the basic lining with basic reagents and the after-blow for oxidizing the phosphorus in the metal after the carbon is all removed. As regards preparing the linings, burnt bricks were made of magnesia by Caron and described in *Dingler's Polytechnisches Journal* in 1868. I used the pulverized materials rammed behind an iron form in 1869, and also in the form of quarried blocks; and, as before stated, my process was used in Du Motay's converter, lined with the magnesia brick. In 1873, Erdmenger described a burnt brick of magnesian lime in *Dingler's Polytechnisches Journal*, and in 1878, Thomas also patented magnesian lime bricks, the composition of which is very similar to that described by Erdmenger, although he claims that it is burnt at a higher heat. I have lately made improvements in the use of basic lining by mixing fluorspar with substances which give the binding property and render it very hard, durable and economical.

The analyses of the slags of my process and that of Thomas are given below. In this case I used titanite iron ore in order that the slag might be identified with certainty, while he uses ordinary lime. The pig iron treated by me was cinder iron, made at the Bowling Iron Works. The pig iron used in the Thomas process contained about 1 per cent. of phosphorus.

My process.	Thomas process.
Silica.....	9.40
Titanic acid.....	13.81
Protoxide of iron.....	64.70
Sequoide of iron.....	10.40
Alumina.....	1.40
Oxide of manganese.....	7.30
Phosphoric acid.....	7.35
Lime.....	4.40

In the mixture of fluorspar and iron ore in my process there was about 15 per cent. of fluorspar, of which there is none in the cinder, the inference being that it was volatilized and passed out of the chimney. As fluorspar has never been isolated and the quantity of phosphoric acid is but one-tenth of that usual in puddling cinder, it is but fair to infer that they have combined and passed away as vapor, as it is known that phosphoric acid is decomposed and eagerly combines with fluorspar with great evolution of heat.

JAMES HENDERSON.

New York, January 11, 1881.

William A. Lighthall, the oldest designer and builder of marine engines in this country, died in Brooklyn recently. He was born in Albany, September 16, 1805. At the age of seventeen he became a machinist in the steamboat business on the North River. Subsequently he became constructing engineer for the Troy Steamboat Company. About 1843 he was appointed engineer in the Revenue Marine Service, and constructed the engines of the revenue cutters Robert J. Walker, Bbb, Thomas Jefferson and James K. Polk. He left the Government service in 1849. He was State Inspector-General of steamboat hulls and boilers in California for three years. From 1847 to 1862 he was inspector of steamboats and boilers in this State.

According to a statement made by Wells, Fargo & Co., the Utah smelting works turned out during 1880, 1446 tons of refined lead, 13,221 tons of unrefined lead, 3,783,566 ounces of silver and 80,208 ounces of gold, the whole valued at \$5,128,000.

Special Notices.

An Experienced Lead Burner

wanted for erecting and maintaining sulphuric acid chambers.

MATTHIESSEN & HEGELER ZINC CO.,
La Salle, Ill.

RESPONSIBLE PARTIES, having a large acquaintance with the Hardware and Iron Trade throughout the country, who are about starting business in New York as Manufacturers' Agents, solicit correspondence with manufacturers not already represented here. Ample space will be afforded for the proper display of samples.

TO MECHANICAL AND MANUFACTURERS.—A sober and industrious young man, thoroughly educated in French as well as in English, for several years in manufacturing business, and now employed as one of the leading wholesale hardware stores of Montreal, where he has been for several years, desires an engagement with a first-class house in any part of the United States, as Bookkeeper, Salesman, Correspondent or Traveller. Highest recommendations from present and former employers. For further particulars apply to
HARDWARE, care of
Mr. J. Hallett, 35 Sanson Street, Montreal, Canada.

TRAVELING SALESMAN WANTED
acquainted with jobbing Hardware trade in the South. Goods staple and well introduced; salary; can be taken with other line, if not conflicting. State what they are. Address P. O. Box 1349, New York.

Special Notices.

Large Stock of New and Second-Hand

MACHINERY.

Three pair Scales, weigh to 3500 lbs. Fairbanks.
One Horizontal Corlis Engine, 200 h. p.
One Horizontal Engine, 26 in. x 18 in. Whitehall & Hampden
One Horizontal Engine, 15 in. x 20 in. Todd & Raf.
One Horizontal Engine, 9 in. x 12 in. Erie Iron Works
Five Horizontal Engines, 9 in. x 12 in. J. & R. J.
Four Horizontal Engines, 8 in. x 12 in. Gray.
One Horizontal Engine, 3 in. x 12 in.
One Portable Engine, 3 horse power
Two Horizontal Return Tub. Boilers, 100 h. p. each.
Two Hor. Tub. Boilers, 5 ft. x 14 ft. 100 3/4 in. tubes.
One Hor. Tubular Boiler, 5 ft. x 15 ft. 83 in. tubes.
One Hor. Tubular Boiler, 6 ft. x 14 ft. 57 in. tubes.
Two Hor. Tub. Boilers, 5 ft. x 14 ft. 50 in. tubes.
Two Hor. Tub. Boilers, 4 1/2 ft. x 13 1/2 ft. 43 in. tubes.
Three Hor. Tub. Boilers, 4 ft. x 13 ft. 34 in. tubes.

MACHINISTS' TOOLS.

One Hydraulic Press, 30 in. ram, in perfect order.
One Lathe, 16 in. x 7 ft. bed.
One Planer, 22 in. x 5 ft. bed.
One Planer, 36 in. x 16 ft. bed. Chain feed.
Two Crank Planers, 18 in. x 12 ft.
One New Haven Drill. Will bore in center of 30 in.
One New Haven Drill. Will bore in center of 30 in.
Two Enaley Drills.
One Vertical Boring Mill, bore from 36 to 90 inches.
One Turn Table and Boring Mill, 11 feet.
One Turn Boring Mill.
One Merrill Compressed Air Hammer, Hotchkiss.
One Upright Drill, to the center of 6 in. (Patent).
One Eighteen Drilling Machines.
Ten Bench Lathes.
One Bogardus Mill, No. 5.
One Bogardus Mill, No. 2.
One Root Blower, No. 1.
One Shurvant Blower, No. 2.
One Large Power Punch for bridge work.
One 3000 ton Hydraulic Press and Pump.
One Dredge Beam Punch.
One Hand Punch, Pope's patent.
Three Vacuum Tanks, 6 ft. x 12 ft.
One hundred Vises.
Five Portable Forges.
Collection Machine.
One Knowles Special Pump, No. 7.
One Gould & Garrison Pump, No. 3.
Six Hardick Pumps, from No. 6 to No. 4. New.
One Woodward Pump, No. 1.
One 7000 lb. 1/2 Plate Iron, for safes.
Two Bliss & Williams Presses.
Five smaller.
A full line of Woodward Steam and Fire Pumps.
One hand-power Paper Cutter.

J. GRAY'S MACHINERY DEPOT,
37 Dey Street, New York, U. S. A.

Warning!

A young man claiming to be the son of our Mr. W. W. Woodruff, has obtained money from some of our friends in Cincinnati, Baltimore, and Philadelphia. He is an IMPOSTOR, and should be turned over to the police.
W. W. WOODRUFF & CO.,
Knoxville, Tenn.

NOTICE.

We own the PATTERNS for the large variety of

MACHINISTS' TOOLS

Formerly made by the

WOOD & LIGHT MACHINE CO.,

and would like to make an arrangement with some machine shop of good size to

Manufacture Tools

for us from said patterns. Address

The Geo. Place Machinery Agency,
121 Chambers and 103 Reade Sts., N. Y.

For Rent.

The large brick FOUNDRY of the FRANKLIN STOVE COMPANY, located on Central Way, Cleveland, Ohio, and adjoining the Valley Railway, will be rented for a term of years on very favorable terms—or will sell—possession given at once. The building is ready for occupancy as a foundry, or can be used for any manufacturing purpose with slight modifications. For particulars, address
G. A. GARRETSON,
Cashier of Second National Bank,
Cleveland, Ohio.

VALUABLE WATER FRONT ON EAST RIVER, BETWEEN EIGHTH & TWENTY-THIRD STS., FOR SALE.

Suitable for iron works or manufacturers, where large water facilities are required. About 50 lots, including land under water.
CHAS. S. BROWN, 17 Liberty St., N. Y.

Slate Planer Iron.

Size of Bed 12 ft. x 4 ft.; price with countershaft, \$500. Also 10,000 ft. 3 in. and other sizes Wrought Iron Steam Pipe; 2000 ft. 6-in. Cast-Iron Heating Pipe. For sale by

A. PURVES & SON,
South and Penn Sts., Phila.

Active or Silent Interest can be Obtained

In a well-established Agricultural Implement manufactory, including Foundry and Saw Mill. A complete works, situated in a flourishing New England town. Trade thoroughly built up and very prosperous. Will make favorable terms, for reasons which will be given. This is a rare opportunity for a lucrative investment.
AGRICULTURAL,
Office of The Iron Age, 83 Reade St., New York.

SWEDISH CHARCOAL IRON WORKERS.—Sinkers, Shinglers, Heaters and Rollers, who understand the trade thoroughly, desire good and steady employment in the above branches.
Address CHAS. AHLSTROM,
Trenton, N. J.

OPEN-HEARTH STEEL.—A gentleman having open-hearth works of this country will be open for an engagement January 1, 1881. Is competent to design, superintend construction and manage works when completed.
Address OPEN-HEARTH STEEL,
Office of The Iron Age, 83 Reade St., New York.

Sanderson Bros. Steel Co.

A limited number of shares for sale by
EDWARD FRITH & SON,
241 Pearl Street, New York.

Special Notices.

For Sale.

Second-Hand Machinery, CHEAP.

We will close out these machines at half their real value. Every engine or machine mentioned here is practically new, being thoroughly repaired and guaranteed by us to be in good order.
One 15 H. P. Erie City Iron Works Boiler, tested to 150 lbs. cold water pressure.....\$150.00
One 6x12 slide valve side crank engine, with pulley, fly-wheel and governor.....200.00
One 6x12 ditto, with pump and heater.....185.00
One 6x12 center crank ditto, with reversing link.....190.00
One 7 1/2 x 12 center crank engine.....120.00
One 5 1/2 x 13 side crank ditto, all complete.....150.00
One 6x10 center crank ditto.....160.00
One 6x10 new center crank ditto.....165.00
One 6x12 portable engine and boiler.....350.00
One 6x12 ditto, ditto, ditto.....275.00
One double back-gear press, with 3 in. stroke, table 24x30 in.; cost, \$450; price.....200.00
One 27 in. x 12 ft. screw cutting engine lathe 300.00
One 12 in. x 5 ft. " " new 105.00
500 drop and post hangers for shafts, 1 1/2 to 3 in. from \$1.65 to \$6.50 each, ready to bolt to any shaft.

YORK & SMITH,
Cleveland, Ohio.

For Sale.

FOUNDRY AND MACHINE SHOP. Established 1842. Well stocked with Patterns and Tools. Business good. Satisfactory reasons for selling. Address
A. L. VAIL,
Middletown, N. Y.

For Sale.

One pair CHILL ROLLS, 25 inches diameter, 30 inches long; necks, 16 inches diameter, 13 1/2 inches long; wabblers, 14 inches diameter, 7 1/2 inches long.
One pair PINIONS, 25 inches diameter, 30 inches to outside of shrouds; necks and wabblers same as on chill rolls.
Six COUPLING BOXES, for above rolls and pinions.
One POPPET VALVE ENGINE, 20-inch bore, 6-foot stroke, with cast-iron fly-wheel in eight sections, 16 inch diameter; rim of wheel, 11 x 12 in. Engine is now in position at our mill.
BRITTON IRON & STEEL CO.,
Cleveland, Ohio.

For Sale.

Hardware Business of 20 years' standing. Stock will invoice about \$10,000. Fresh and in good condition. To a party with the money this is an opportunity that seldom offers.

For particulars inquire of
JOHN BINDLEY,
186 Federal street,
Allegheny City, Pa.

For Sale.

One Horizontal Boiler, one 11 in. flue, 15 feet long, 30 in. diam.....Price, \$150.00
One Horizontal Boiler, two 11 in. flues, 18 ft. long, 32 in. diam.....Price, \$175.00
One Locomotive Boiler, two 12 in. flues, 12 ft. long, furnace 18 in. diam.....Price, \$200.00
One Union Boiler, 8 ft. long, 30 in. diam., with 3 in. tubes.....Price, \$100.00
One Upright Boiler, 8 ft. high, 30 in. diam., with 20 one in. tubes.....Price, \$100.00
One Upright Boiler, 3 ft. high, 30 in. diam., with 30 one in. tubes.....Price, \$60.00
One Engine and Boiler complete and nearly new, engine cylinder 8 1/2 in. fly wheel 6 ft. diam. Upright boiler 24 in. diam. 36 in. tubes.....Price, \$500.00
One seven H. P. boiler engine.....Price, \$60.00
One new engine cylinder 37.....Price, \$60.00
Ten per cent. off to any party purchasing the whole lot. Also one B. R. Locomotive Standard gauge cylinder 10x24, weight, 60,000 lbs. Needs a little repairing. Price very low.
R. FRAZER, Agent, Bordenstown, N. J.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address HARDWARE,
Box 366, Salina, Kansas.

For Sale.

HARDWARE.—The controlling interest or the whole of a Jobbing Hardware House, already established and doing a profitable business; located in one of the large Western cities. For further particulars, address
C. A.,
Office of The Iron Age, 83 Reade St., New York.

For Sale.

LARGE SLOTTED, 6 ft. between Columns, 4 ft. Table, stroke 18 in., ind. cross and circular movements. A heavy, well-built tool; in first-rate order; will be sold low. Photo. on application.
A. G. BROOKS & WINBRENER,
261 N. Third street, Philadelphia.

For Sale.

PARIS FURNACE CO.
A fine manufacturing property, located at Clayville, Oneida Co., New York, 1 miles south of Utica. Two distinct Water-powers, Steam Engine, Shafting, Hangers, Pulleys, &c. Works built and used for manufacturing Scythes, Forks, Hoes, &c. For terms, description, &c., address
B. F. AVERY & SONS, Louisville, Ky.

FOR SALE,

Job Lots and Bankrupt Stocks Hardware.

Great bargains offered to the trade.

A. W. WHEELER,

141 Lake St., Chicago, Ill.

ENGINE AND BOILER FOR SALE.

Steam Engine, 6x15, with 15-horse-power boiler, feed pump and heater, nearly new and in good order. One (1) as on-hand "Peck" Lifter, not geared; will raise hammer of 300 lbs. weight.
BECKER & PECK,
Lock Box 120, New Haven, Conn.

Notice.

To Manufacturers of Farming Tools.
I want a party to manufacture a NUMBER ONE HAY KNIFE on Hopyak, or will sell the patent on reasonable terms. Address
A. ZIMMERER,
Care Bischof & Zimmerer, Hardware,
Nebraska City, Neb.

Special Notices.

PHILADELPHIA, Jan. 7, 1881.
TO THE TRADE.

The undersigned, the last representative of the firm of J. BARTON SMITH & CO., established in 1849, finding it no longer possible to alone give proper attention to the increased demand for its celebrated brand of Files and Rasps, has transferred the business to the J. BARTON SMITH COMPANY. Thanking the trade for its liberal patronage in the past he respectfully solicits a continuance of the same for the new firm.

CHARLES F. CRIPPE.

Office and Works of the J. BARTON SMITH Co., Nos. 211, 215, 217 New Street, PHILADELPHIA, Jan. 1, 1881.

Referring to the above, the undersigned beg to assure the trade that they will faithfully preserve in the future the high reputation of the well-known goods of the late firm of J. Barton Smith & Co., and with largely increased facilities will be able to promptly fill all orders they may be favored with. In addition to the line of Files and Rasps, they will also manufacture a full line of Wood Saws, Butchers' Saws, &c., of equal merit to the best made, soliciting the favors of the trade at lowest market rates. Respectfully,
GILBERT PARKER, Treasurer and Genl. Agt. New York Branch, No. 123 Chambers street, Wm. H. Bramhall, Manager, P. O. Box 2813.

Bissell & Welles, Wholesale Hardware Auctioneers, 53 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments accepted. We refer to the leading Manufacturers and Importers.

House to Exchange for Hardware.

The owner being permanently engaged in business at the West, will sell his dwelling in Elizabeth, N. J., cheap for cash or in exchange for Hardware. The house is near business centers, a pleasant walk of three minutes from Depot. The lot is 57 feet front, shaded by four handsome trees; in the rear are choice fruit trees and grape vines. Has a good well and cistern, in addition to aqueduct water. Ten rooms in the house and all modern improvements and conveniences. A very desirable home for anyone doing business in New York. Letters addressed to

"EXCHANGE,"

Office of The Iron Age, 83 Reade St., New York, will receive the personal attention of the owner's agent, who will be in New York about Dec. 20th.

No. 53 Dey Street, N. Y.,
January 1, 1881.

The copartnership heretofore existing between John H. Butler and Teunis D. Hunting, under the firm name of Butler & Hunting, has this day been dissolved by the withdrawal of said Teunis D. Hunting.

Mr. Butler and Mr. John C. Constant have this day formed a copartnership for continuing the business at the same place, under the firm name of Butler & Constant. Mr. Butler will pay all obligations, and receive all assets of the old firm of Butler & Hunting.

JOHN H. BUTLER,
TEUNIS D. HUNTING,
JOHN C. CONSTANT.

To Manufacturers.

The subscriber desires to connect himself with a well-established manufacturing business, by purchasing interest in same. Is thoroughly familiar with general commission business, custom-house entries and bookkeeping; is quick and active, a good correspondent, and able to conduct negotiations in French, Italian, Portuguese and Spanish. Has best of references. Address, AMERICAN, P. O. Box 1927, Philadelphia.

To Manufacturers and Hardware Merchants.

WANTED.

By a man of experience in positions of trust, who has a knowledge of the requirements of the export trade in American Hardware, having resided and traveled abroad for business, also held for several years past a responsible position in a manufactory, a new engagement as office man or travel to solicit trade and establish connections in foreign countries.
Address, ENTERPRISE,
Office of The Iron Age, 83 Reade Street, N. Y.

Wanted.

The undersigned wishes to buy an 8 or 9-inch Train of Rolls for Rolling Steel, with Boiler and Engine suitable to run the rolls. Must be in complete running order.
Address, stating terms and capacity,
E. M. GRANT,
Cleveland, Ohio.

Wanted.

An experienced Hardware Man desires to act as buyer for country hardware merchants. Best references furnished.
Address "HARDWARE,"
Office of The Iron Age, 83 Reade St., New York.

Wanted.

TO PURCHASE 8 or 10 NAIL MACHINES. Please address, stating size, condition and price,
NAILER,
Care of Jos. D. Weeks,
Office of The Iron Age, 77 4th Ave., Pittsburgh, Pa.

Wanted.

HARDWARE.—Situation as Manager, Buyer or Head Salesman in the Hardware business. Am thoroughly posted in all its branches and with the trade in the West and Far West; been head salesman of late with the Chicago Stamping Co., and before that with Wm. Blair & Co., both of Chicago, to whom I would respectfully refer.
Address A. GUSTORFF,
Care J. B. Mayo, Palmer House, Chicago, Ill.

Situation Wanted

as Mill and Forge Manager. Have had large experience both in this country and England in the practical management of Bar, Plate and general Merchant Mills.
Address, SAMUEL ADAMS,
McKeesport, Pa.

Locomotive Wanted

A light Locomotive, 3 ft. gauge. Address, stating condition and price,
LOCOMOTIVE,
Care of The Iron Age, Box 1547, Pittsburgh, Pa.

WANTED—A GOOD TIN AND SHEET IRON Worker.
HOBART, N. Y., Jan. 1, 1881.

Special Notices.

ROOMS OF

THE HARDWARE BOARD OF TRADE,

LIMITED.

Incorporated A. D. 1877.

Nos. 4 and 6 Warren St., New York.

To the Trade and Public:

We are compiling, preparatory to issuing in January, 1881, a limited number of strongly bound books, to contain the names and financial standing, as well as credit ratings, of some Fifty Thousand dealers in Hardware, Cutlery, Guns, Tinware and Stoves, Metals, Iron, Foundries, Machinery of all kinds (including Sewing Machines), Iron and Metal Pipe, Brass Fitting, Plumbers and Dealers in Plumbers' Supplies, and other trades kindred to these throughout the United States.

A large expenditure of money and the very best means have been used to obtain reliable information for the work, and those desiring it can depend upon the information being fresh and largely drawn from those selling the firms, corporations and individuals rated, and the information is as reliable as it is possible to obtain for such a work.

For Wholesale Dealers and Manufacturers it is the most desirable work of the kind, as it is prepared with great care, and should be consulted where extended credits are asked. All are not safe for credit because apparently prosperous, and detailed information given at the office will largely aid in forming correct judgments.

The Board of Directors of this company have placed a limit to the number of these books to be issued, and under no circumstances will orders placed beyond that number be filled.

The subscription price to the book is placed at THIRTY DOLLARS. All orders must be accompanied by draft on New York for the amount. We respectfully ask all who desire a copy of this book to forward their orders at once, as they will be entered and filled in the order received.

THE HARDWARE BOARD OF TRADE, Limited,

By JAS. H. GOLDEY, Actuary.

To Railroad Engineers, Importers and Others.

DAVID OWEN,

Inspector of Steel and Iron Rails,
Merthyr Tydfil, England.

Undertakes the inspection of Steel and Iron Rails, Permanent Way Materials, &c., &c., in England, Belgium and Germany. Thoroughly practical of many years' experience. Can give very best of references from chief railroad engineers, merchants and others who have employed him to inspect their railroad materials during manufacture and delivery for the last 20 years.
Correspondence solicited. Instructions by mail or cable punctually attended to.

ON HAND AND FOR SALE.

Horizontal Boiler, 45 in. x 10 ft., 28 in. tubes, 3/4 shell, 7 1/2 heads.
Horizontal Boiler, 45 in. x 10 ft., 28 in. tubes, 3/4 shell, 3/4 heads.
Vertical Boilers, with Bases, Grates and Fittings, 45 in. x 7 ft., 20 in. tubes, shell and fire-box 3/4 in. heads 3/4 in. New.
36 in. x 6 ft., 20 in. tubes, shell and fire-box 3/4 in. heads 3/4 in. Rebuilt.
30 in. x 6 ft., 17 in. tubes, shell and fire-box 3/4 in. heads 3/4 in. New.
30 in. x 6 ft., 17 in. tubes, shell and fire-box 3/4 in. heads 3/4 in. Second hand.
15 1/2 x 36 Horizontal Engine, 9 ft. x 15 in. band wheel, Jacob Taylor.
12 x 24 Horizontal Engine, segment fly wheel 4500 lbs. James Moore.
10 x 20 Horizontal Engine, band wheel 7 ft. x 12 in.
12 x 12 Vertical Engine, band wheel 54 in. x 12 in.
7 x 12 Vertical Engine, band wheel 42 in. x 10 in.
A. G. BROOKS & WINBRENER,
261 North Third St., Philadelphia.

THOSE WISHING TO BUY OR HAVE FOR

SALE SECOND-HAND

PRESSES or DROP HAMMERS

will please communicate with

N. C. STILES,

Middletown, Conn.</

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, JANUARY 13, 1881.

During the past week the Wall street markets have been active, and generally speaking, strong. The money market is still firm, and the ruling rates on call loans have been 5 @ 6%, with occasional accommodations at 4%.

The importations of specie and bullion at this port during the week ending January 7, were \$1,969,589, consisting of \$1,957,848 in gold and \$11,741 in silver, as against a total of \$155,916 for the week ending January 10 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1—1881.	1880.
Gold.....	\$1,150,079	\$1,160,315
Silver.....	10,511	5,004
Total.....	\$1,160,590	\$1,165,319

Government bonds have been strong and higher by 1/4 @ 3/4. State bonds have been quiet and steady; railroad bonds are strong and are quoted from 1 to 1/2 % higher than last week. We give below the closing quotations of government bonds.

The stock market continued strong, with advancing prices, until Tuesday, when a decline of 1/4 @ 3/4 occurred, which was subsequently recovered. The favorites among speculative shares were those of the competing telegraphic companies. It is now generally known that for some time past negotiations looking to the absorption of the American Union Company by the Western Union Company have been in progress, and that these negotiations are now practically concluded. It is not admitted that an agreement has yet been reached, but it is intimated that only comparatively unimportant details remain to be settled. This is as much as good authority can be obtained for. Beyond this, rumor says that the companies are to be united and new stock issued, Western Union stock going into the new company at par, American Union at par, and Atlantic and Pacific at 50—each in proper proportion; that the plan then will be to turn over the company to the government. Where the truth of this rumor begins and ends it would be difficult to say. After telegraph stocks, the principal dealings of the week have been in Erie, Lake Shore, Northwest, Milwaukee and St. Paul, Washburn, Union Pacific, Pacific Mail and the coal stocks. We give below the closing quotations of active stocks.

The following is an analysis of the bank totals of this week compared with that of last week:

	Dec. 31.	Jan. 8.	Comparison.
Loans.....	\$97,047,000	\$94,018,000	Inc. \$3,029,000
Specie.....	28,727,000	31,317,400	Inc. 2,590,400
Legal tenders.....	70,844,500	75,704,300	Inc. 4,859,800
Deposits.....	68,115,725	71,448,925	Inc. 3,333,200
Reserve.....	2,777,775	4,819,375	Inc. 2,041,600
Circulation.....	18,405,200	13,424,400	Inc. 4,980,800

For the week ended January 8:

	1879.	1880.	1881.
Total for week.....	\$4,267,832	\$6,915,599	\$6,803,518
Reported Jan. 1.....	4,267,832	6,915,599	6,803,518

Included in the imports of general merchandise for the week were articles valued as follows:

	Quantity.	Value.
Anvils.....	5	\$138
Brass goods.....	9	1,273
Bronzes.....	13	2,199
Chains and anchors.....	25	1,125
Copper.....	111	111
Cutlery.....	140	40,227
Flint.....	153	1,469
Guns.....	74	14,087
Hardware.....	9	1,937
Iron, pig, tons.....	2,754	69,173
Iron, sheet, tons.....	18	1,469
Iron, cotton ties.....	1,258	1,075
Iron ore, tons.....	627	2,680
Iron, other, tons.....	278	8,978
Metal goods.....	8	15,738
Needles.....	9	2,084
Old metal.....	4	4,751
Platina.....	1	100
Plated ware.....	1	10
Perforation caps.....	3	353
Saddlery.....	8	823
Steel.....	7,576	55,771
Silverware.....	5	579
Tin, boxes.....	12,658	58,748
Tin, 1/2 lb. slabs.....	35,941	35,941
Wire.....	350	7,380
Zinc.....	27,707	1,251

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Copper.....	111	111
Cutlery.....	140	40,227
Flint.....	153	1,469
Guns.....	74	14,087
Hardware.....	9	1,937
Iron, pig, tons.....	2,754	69,173
Iron, sheet, tons.....	18	1,469
Iron, cotton ties.....	1,258	1,075
Iron ore, tons.....	627	2,680
Iron, other, tons.....	278	8,978
Metal goods.....	8	15,738
Needles.....	9	2,084
Old metal.....	4	4,751
Platina.....	1	100
Plated ware.....	1	10
Perforation caps.....	3	353
Saddlery.....	8	823
Steel.....	7,576	55,771
Silverware.....	5	579
Tin, boxes.....	12,658	58,748
Tin, 1/2 lb. slabs.....	35,941	35,941
Wire.....	350	7,380
Zinc.....	27,707	1,251

Government bonds were strong throughout and closed at the highest prices of the day. We quote:

	Bid.	Asked.
U. S. 6's 1881 registered.....	101 1/2	101 3/4
U. S. 6's 1881 coupon.....	101 1/2	101 3/4
U. S. 6's 1881 registered.....	101 1/2	101 3/4
U. S. 6's 1881 coupon.....	101 1/2	101 3/4
U. S. 4 1/2's 1881 registered.....	112 1/2	112 3/4
U. S. 4 1/2's 1881 coupon.....	112 1/2	112 3/4
U. S. 4's 1897 registered.....	113 1/2	113 3/4
U. S. 4's 1897 coupon.....	113 1/2	113 3/4
U. S. Currency 6's 1895.....	130	130
U. S. Currency 6's 1896.....	131	131
U. S. Currency 6's 1897.....	132	132
U. S. Currency 6's 1898.....	133	133
U. S. Currency 6's 1899.....	134	134

The following were the closing quotations of active stocks:

	Bid.	Asked.
Arizona.....	4 1/2	4 3/4
American Union Telegraph.....	85	93 1/2

American District Telegraph.....	61 1/2	61 3/4
Atlantic and Pacific Telegraph.....	45 1/2	45 3/4
Alton and Terre Haute.....	118	119 1/2
Bur. Cedar Rapids & North.....	77	77 1/2
Burlington and Quincy.....	176 1/2	177 1/2
Climax.....	3 1/2	3 3/4
Consolidated Coal.....	40 1/2	40 3/4
Canada Southern.....	75 1/2	75 3/4
C. C. and I. C.....	21 1/2	21 3/4
Col. Chic. C. and Indiana.....	95	95 1/2
Chicago and Alton.....	150	150 1/2
Central Pacific.....	95 1/2	95 3/4
Colorado Coal.....	30 1/2	30 3/4
Chesapeake and Ohio.....	23 1/2	23 3/4
Chicago, St. Louis and New Orleans.....	40 1/2	40 3/4
Delaware, Lack. and Western.....	111	111 1/2
Delaware & Hudson Canal.....	95 1/2	95 3/4
Denver and Rio Grande.....	90 1/2	90 3/4
Erie.....	50 1/2	50 3/4
Eric and Western.....	93 1/2	93 3/4
Excelsior Mining.....	6 1/2	6 3/4
Homestake.....	28	28 1/2
Express-Adams.....	113	113 1/2
" Wells, Fargo.....	113	113 1/2
" American.....	63 1/2	63 3/4
" United States.....	52 1/2	52 3/4
Hannibal and St. Joseph.....	51	51 1/2
Houston and Texas.....	104 1/2	104 3/4
Illinois Central.....	126	126 1/2
Int. and Great Northern.....	54	54 1/2
Iron Mountain.....	53 1/2	53 3/4
Kansas and Texas.....	43 1/2	43 3/4
Keokuk and Des Moines.....	14	14 1/2
" Pref.....	40 1/2	40 3/4
Levee Shore.....	131	131 1/2
Little Pittsburgh.....	9 1/2	9 3/4
Louisville, New Albany and Chic.....	60	60 1/2
Louisville and Nashville.....	90 1/2	90 3/4
Mobile and Ohio.....	21	21 1/2
New Jersey Central.....	122 1/2	122 3/4
Morris and Essex.....	108	108 1/2
Metropolitan Elevated.....	108	108 1/2
Marquette and Cincinnati Pref.....	9	9 1/2
Manhattan Elevated.....	5 1/2	5 3/4
Nash. and Chattanooga.....	68	68 1/2
New Central Coal.....	30	30 1/2
New York Central.....	150 1/2	150 3/4
New Jersey Central.....	86 1/2	86 3/4
Northern Pacific.....	31 1/2	31 3/4
" Pref.....	65 1/2	65 3/4
New York Elevated.....	125 1/2	125 3/4
Northwest.....	120 1/2	120 3/4
Oregon Navigation.....	138 1/2	138 3/4
Ohio.....	30 1/2	30 3/4
" Pref.....	105	105 1/2
Omaha.....	45 1/2	45 3/4
Ontario Silver.....	33 1/2	33 3/4
Ohio Central.....	24 1/2	24 3/4
Ontario and Western.....	21 1/2	21 3/4
Pacific Mail.....	21 1/2	21 3/4
Panama.....	215	215 1/2
Peoria, Decatur & Evansville.....	30	30 1/2
Pennsylvania Coal.....	240	240 1/2
Quicksilver.....	54 1/2	54 3/4
" Pref.....	54 1/2	54 3/4
Silver Cliff.....	3 1/2	3 3/4
Reading.....	61 1/2	61 3/4
Rome, Watertown & O.....	28	28 1/2
Rock Island.....	135 1/2	135 3/4
St. Paul and Duluth.....	40	40 1/2
St. Paul.....	73 1/2	73 3/4
" Pref.....	114	114 1/2
Stormont.....	15 1/2	15 3/4
Sutro Tunnel.....	15 1/2	15 3/4
Standard.....	23	23 1/2
San Francisco.....	50 1/2	50 3/4
" Pref.....	100 1/2	100 3/4
Texas Pacific.....	41	41 1/2
Union Pacific.....	112 1/2	112 3/4
Western Union.....	40 1/2	40 3/4
Wabash and Pacific.....	45 1/2	45 3/4
" Pref.....	88 1/2	88 3/4

The following were the closing quotations of mining stocks:

	Bid.	Asked.
Amie.....	30	30 1/2
Alta Mont.....	1.80	2.00
American Flag.....	24	26
Bechtel.....	85	91
Bonanza C.....	30	31
Bull Dog.....	3.25	3.50
Bulwer.....	1.40	1.50
Boulder.....	30	30 1/2
Calaveras.....	21	22
Cale. B. H. & Co.....	70	72 1/2
California.....	1.35	1.40
Climax.....	47	48
Consolidated Virginia.....	2.10	2.15
Chrysolite.....	1.50	1.55
Cherokee.....	1.60	1.65
Dalhousie.....	9	10
Eureka C.....	19.00	19.50
Finley.....	22	23
Great Eastern.....	40	42
Gold Placer.....	40	50
Gold Stride.....	2.40	2.50
Goodshaw.....	80	90
Green Mountain.....	4.00	4.50
Hukil.....	1.35	1.40
Independence.....	20	25
Lacrosse.....	27	28
Leadville.....	52	54
La Plata.....	9 1/2	9 3/4
L. Chief.....	86	88
Little Pitts.....	250	250 1/2
Mariposa.....	65	65 1/2
Moore.....	1.45	1.50
Navajo.....	1.45	1.50
North Star.....	75	77
N. Bell I.....	40	42
Red Elm.....	12	13
Rampack.....	13	14
R. Sun.....	1.90	2.00
South Hite.....	59	60
Red Buller.....	35	35 1/2
Silver Cliff.....	3.30	3.50
Tuscarora.....	28	30
Unadilla.....	12	13
Willshire.....	1.00	1.05

GENERAL HARDWARE.

Business, considering the season and the difficulties attending transportation, is fair; the city trade keeps up remarkably well, and the demand from this source is satisfactory. In foreign Hardware no changes in values are announced, and the demand is light, as is usual this month.

The demand for Nails is somewhat more active than at our last writing, but the business is confined to supplying the requirements of the moment, and there is an absence of inquiry for large parcels. The tone of the market in regard to price is firm, and we do not hear of any deviation from the recently established basis. We quote as before, rod to 60d., \$2.90 @ \$3.00 net, according to quantity.

The price of Strap and T Hinges is rather demoralized, and the combination rate, viz., discount 50 and 10 per cent., may be regarded obsolete, as some makers freely quote discount 60 and 10 per cent., and rumors of even lower figures are in circulation. Sargent & Co. have in press the following circular:

Office of SARGENT & CO.,
37 CHAMBERS STREET, NEW YORK,
JANUARY 9, 1881.

Dealers in Strap and T Hinges will obtain our prices for these goods before purchasing elsewhere. Very respectfully,
SARGENT & CO.,
Manufacturers of Strap and T Hinges.

The manufacturers of Manila and Sisal Rope advanced their prices half a cent per pound on the 5th instant. We print below

their revised price list, which is subject to the usual trade discount:

MANILA ROPE.		Cents per lb.
1 1/2 inch cir. and upwards.....	1 1/2	14 1/2
12 thread, or 3/4 inch diameter.....	14 1/2	14 1/2
6 and 9 thread, or 1/2 and 3/4 inch diameter.....	14 1/2	1

Old Rails.—Are in active demand, and a large business was done during the week. Sales aggregating 5500 tons at \$27 @ \$28, and 2500 tons Double-Heads at \$29 @ \$30 are reported. The market, at the close of business to-day, was strong, \$30 @ \$31 being the quotation for D. H., and \$28.50 for T's.

Scrap.—The inquiry for Wrought Scrap is more active than at our last writing, and we hear of \$28 being bid and declined for No. 1 Selected. We quote the same \$29 @ \$30 from yard.

Carmichael & Emmens, Nos. 130, 132 and 134 Cedar street, have issued, under date of January 1, a circular, in which they say: "We beg to inform you that Mr. William P. Worth, of Contesville, Pa., has this day been admitted to an interest in our business, which will be conducted hereafter under the firm name of Carmichael, Emmens & Worth."

METALS.

Copper.—A good feeling has prevailed in our market for the week, and greater business is displayed. Sales of Lake Superior sum up 250,000 to 300,000 pounds at 19 1/4¢ on the spot. February and March futures may still perhaps be obtainable at 19 1/2¢. We quote Baltimore 18 1/4¢. The production of Lake Superior last year is stated to have been something like 49,000,000 pounds of copper. England quotes Chili bars \$62.10, and Best Selected \$68. News from the seat of war on the Pacific is now expected with more than usual interest; it is hoped that it may prove of a decisive nature, and be soon followed by peace. Should the latter now be brought about, Chili will soon recover her full capacity of production, and this will not fail to exercise an influence on the London Copper market after a couple of months. Manufacturers remain as under: Bottoms, 31¢; Braziers, according to size, 25¢ @ 34¢; Circles, 31¢ @ 34¢; Segment Sheets, 31¢; Fire-box Sheets, 25¢; Sheathing, 26¢; and Bolt Copper, 28¢.

Tin.—Our market has been pretty firm, and even strong; the bulk of stock is held for higher prices, there being now only about 500 tons of marketable tin floating about. Besides the ordinary jobbing trade, we note a sale of 100 tons Straits at 20¢, cash. London quotes Straits \$22.10, spot, to \$23.10, futures. Singapore is steady at \$28.75, equal to 21 1/2¢, here. We quote large line Straits, 20 1/4¢ @ 2 1/2¢, and Billiton, 20 1/4¢. Tin Plates.—These have remained stationary; the demand is good, but prices do not improve. We quote at the close, large lots, ordinary brands, per box: Charcoal Bright, \$5.87 1/2 @ \$6.25; do. Termes, \$5.37 1/2 @ \$5.50; Coke Tin, \$5, and do. Termes, \$4.87 1/2 @ \$5. At Liverpool Cokes are worth 15/ and Charcoal 18/ @ 20/, according to grade. To-morrow a meeting of makers is to come off in England, which will probably lead to some important steps on their part. It is a well-known fact that they are just at present working at a loss, for the increase in value of the raw material causes Coke Tin to cost something like 16/, and a curtailment of production may be resorted to by them in order to come to the relief of the market and restore the equilibrium.

Lead.—Quite a reaction from the late prostration in point of price can be announced after the sale of some 2000 tons Common Domestic at \$4.30 and up to \$4.87 1/2, now held at 5¢ @ 5 1/2¢. At the close, 200 tons Newark were sold at 5¢. The stock here does not exceed 3500 tons. It should be remarked, however, that the demand at present is not very active, owing to the season. Corroders hold but light stocks. Refined Lead is nominally worth 5 1/2¢. Manufacturers are quoted as follows: Sheet Lead, 7¢; Lead Pipe, 6 1/2¢; Tin-lined ditto, 15¢; and Block Tin Pipe, 40¢.

Spelter and Zinc.—Although no business beyond a jobbing trade has transpired during the week, the tone of the market has been rather gaining in strength, and we quote Common Domestic, 5¢ @ 5 1/4¢. White Silesian is held at 5 1/2¢. Sheet Zinc is worth 7¢ @ 7 1/2¢.

Antimony.—Has remained unaltered at 14 1/4¢ @ 15¢, according to brand.

COAL.

The severe weather of the past few weeks has had a somewhat marked effect upon the trade, especially in the vicinity of New York city. The quantity of Coal in the retail yards is small, and, as the consumption is large, the stocks are greatly reduced. The result of this is that there is a considerable local demand for domestic Coal wanted for immediate consumption. Ice in the river, harbor and inlets leading to the shipping ports has accumulated to such an extent as to seriously obstruct navigation. At the present moment, all the Coal coming into the harbor from below has to come outside through the narrows. Freight rates are as high as 40¢ per ton, while from Hoboken the rate is 25¢. The quantity of Coal coming down from the mines is greatly reduced by the ice, snow and difficulty of transportation in severe weather. Instead, therefore, of a half supply, as the restriction nominally gives, the amount is considerably less. It is even said, by some dealers, that if the mines were run full time and the roads handled all that they could transport, no more would come to tide water than the market needs. It appears, in spite of the briskness, that the market does not require a very large amount of Coal to supply the demand. The number of orders booked does not seem to be greatly in excess of the quantity of Coal received at the shipping points. The brisk demand seems to be largely the result of the fact that the local supply is short, and domestic Coal for immediate delivery cannot be obtained at any figure. The larger or manufacturing Coals are by no means as brisk as the domestic. The small Lohigh Coals are quoted as fully up to the circular rates, and it is even said by some that the quotation for Chestnut is \$4.10 or \$4.15. This need frighten nobody, for there is little or no Chestnut for sale, so far as we can learn. Those who ask \$4.15 are not willing to promise a delivery within less than two months. "So long

as they have no Coal to sell, it does not make any difference what they ask for it," was the philosophic comment of a dealer who wished to purchase. Stove Coal is reported as \$4.30, while others say full circular prices, "with the usual commission to dealers." The larger sizes are somewhat slack and the prices vary according to the circumstances of the parties. Vessels are scarce, and few are offering around the Cape. Nominally, the rate to Boston is \$1.60, but we hear of no shipments at that figure. Providence is quoted at \$1.15. Boats, as well as vessels, are scarce.

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending January 11, 1881:

Danish West Indies.		United States of Columbia.	
	Quan. Val.		Quan. Val.
Rifle, case, 1	1	Lamps, pkgs.	15 272
Hdw., case, 1	1	Polim., gals.	280 58
Pdw., case, 1	1	Cutlery, case, 1	1 1069
Glassware, case, 1	1	I. r. goods, case, 1	6 432
		Mach'y, case, 1	14 354
		Rifles, case, 1	3 70
		Tinware, case, 1	51
		Glassware, case, 1	36 462
		Carriages, case, 1	2 475
		Hdw., case, 1	46 822
		New, mach., case, 1	132 4433
		Refrigerators, case, 1	64
		Mf. iron, pkgs.	3 64
		Clocks, case, 1	33
		Pdw., case, 1	8 851

Hamburg.		Central America.	
	Quan. Val.		Quan. Val.
Clocks, case, 1	1 457	Pdw., case, 1	70
Belt, case, 1	1 121	Hdw., case, 1	3 508
Hdw., case, 1	1 121	Hdw., case, 1	44
Mach'y, case, 1	1 430	Polim., gals.	1 244
I. r. goods, case, 1	1 430	Sew. ma., case, 1	180
Mf. iron, pkgs.	50 830	Iron, sheets, 33	183
		Mach'y, case, 1	60
		W. closets, case, 1	3 109
		Mf. iron, pkgs.	17 170
		Wire, spools, 45	388

Copenhagen.		Marseilles.	
	Quan. Val.		Quan. Val.
Hdw., case, 1	1 350	Polim., gals.	311 2109
Glassware, case, 1	1 350		
Sew. ma., case, 1	1 350		
Ag. imp., pkgs.	1 350		

Bremen.		Mexico.	
	Quan. Val.		Quan. Val.
Polim., gals.	350 2672	Polim., gals.	30 4057
Hdw., case, 1	1 260	Glassware, pkgs.	18 207
Mf. iron, pkgs.	20 730	Mf. iron, pkgs.	320 1519
Pdw., case, 1	1 730	I. r. goods, case, 1	1 25
Wheels, case, 1	1 730	Glass, case, 1	25 90

Antwerp.		Rotterdam.	
	Quan. Val.		Quan. Val.
Hdw., case, 1	1 410	Mf. iron, pkgs.	3 313
Mach'y, case, 1	1 410	Hdw., case, 1	40 90
Telephones, case, 1	1 384	Stones, pkgs.	9 20
Lub. oil, bbls.	48 650	Mach'y, case, 1	30 704
Mf. iron, pkgs.	8 193	Gas fixt., case, 1	8 959

Plymouth.		London.	
	Quan. Val.		Quan. Val.
Naphtha, gals.	300 3500	Hdw., case, 1	137 5307
Polim., gals.	68 819	Bulldozers, case, 1	12 16
		Ag. imp., pkgs.	6 7135
		Metals, pkgs.	368 55450
		Iron safe, case, 1	1 120
		Spelter, slabs, 46	1180
		Mach'y, case, 1	18 475
		Mf. iron, pkgs.	15 695
		Lub. oil, bbls.	1 191
		Staves, case, 1	1 145
		Rifles, case, 1	3 692
		I. rolls, case, 1	675
		Clocks, case, 1	186 5008
		Iron, gals.	155 2029
		Glassware, case, 1	37 1393

Bristol.		Hull.	
	Quan. Val.		Quan. Val.
Spokes, case, 1	1 850	Hdw., case, 1	17 569
Lub. oil, bbls.	14 115	Clocks, case, 1	48 998
		Mf. iron, pkgs.	34 916

Alicante.		Glasgow.	
	Quan. Val.		Quan. Val.
Polim., gals.	181 17000	Ag. imp., pkgs.	121 3100
Nails, case, 1	12 45	Wh'la, crates, 6	250
		Mf. iron, pkgs.	4 350
		Cartridges, case, 1	1 8
		Hdw., case, 1	14 130
		Wire, case, 1	10 1069
		Pdw., case, 1	5 354
		Belt, case, 1	717
		Glassware, case, 1	4 80

Bilbao.		British West Indies.	
	Quan. Val.		Quan. Val.
Polim., gals.	95 800	Glassware, pkgs.	380
		Hdw., case, 1	60 704
		Tinware, case, 1	3 61
		Sew. ma., case, 1	55
		Clocks, case, 1	19 338
		Polim., gals.	31 3825
		Cutlery, case, 1	1 10
		Saddlery, case, 1	93
		Mf. iron, pkgs.	10 100
		Nails, case, 1	152 585
		Mf. iron, pkgs.	24 301
		Tin, case, 1	4 16
		Hoops, bbls.	15 165
		Belt, case, 1	337
		Revolvers, case, 1	94

British North American Colonies.		British Australia.	
	Quan. Val.		Quan. Val.
Glassware, pkgs.	8 77	Nails, case, 1	620
Polim., gals.	2500 700	Burners, case, 1	3 170
Mf. iron, pkgs.	130 120	Pumps, pkgs.	14 880
Hdw., case, 1	1 310	Wire g'ds, case, 1	8 995
Pig iron, tons.	100 1300	Ag. imp., pkgs.	39 1115
		Mach'y, pkgs.	115 7880
		Lamp g'ds, pkgs.	5 141
		Buggies, pkgs.	6 825
		Gasoline, gals.	300 147
		Saddlery, pkgs.	1 93
		Hdw., case, 1	500 11709
		Electro-plate, case, 1	24 999
		Mf. iron, pkgs.	74 398
		Clocks, case, 1	73 1339
		Nails, case, 1	110 60
		Wire, spools, 12	81
		Sew. ma., case, 1	209 4881
		Pdw., case, 1	20 486
		Crucibles, case, 1	8 425
		Watch keys, case, 1	345

British Possessions in Africa.		Malta.	
	Quan. Val.		Quan. Val.
Ag. imp., pkgs.	26 415	Polim., gals.	130 606
Nails, case, 1	320	Silverware, case, 1	1 250
Tinware, case, 1	81	Mach'y, pkgs.	1 1415
Polim., gals.	108 540	Refrigerator, case, 1	80
Hdw., case, 1	14 160		
Wire, spools, 12	81		
Cartridges, case, 1	60 84		
Carriage, case, 1	1 135		
Clocks, case, 1	21 330		

Canada.		Guns, case, 1	
	Quan. Val.		Quan. Val.
Polim., gals.	130 606		
Silverware, case, 1	1 250		
Mach'y, pkgs.	1 1415		
Refrigerator, case, 1	80		

Hayti.		Liverpool.	
	Quan. Val.		Quan. Val.
Nails, case, 1	35 270	Hdw., case, 1	3 124
Lamp g'ds, pkgs.	15 272	Clocks, case, 1	4 531
Photo. mtl., case, 1	1 10	Machinery, case, 1	13 550
Belt, case, 1	1 10	Old met. bbls.	30 800
Polim., gals.	5771 761	Watch mtl., case, 1	1 1000
Hdw., case, 1	1 186	Clocks, case, 1	9 1002
Mf. iron, pkgs.	24 114	Nails, case, 1	30 114
Nails, case, 1	10 33	Metal g'ds, case, 1	3 100
		Pig iron, tons	15 295

British Guiana.		Sandwich Islands.	
	Quan. Val.		Quan. Val.
Polim., gals.	5000 625	Pumps, pkgs.	13 3070
Pdw., case, 1	1 53	Nails, case, 1	300 659
Grindstones, case, 1	150 106	Polim., gals.	350 6750
Hdw., case, 1	17 372	Cutlery, case, 1	7 190
Polim., gals.	10,000 1,250	I. r. goods, case, 1	2 278
Nails, case, 1	50 132	Mf. iron, pkgs.	1026 6,000
Mf. iron, pkgs.	1 22	Car wheels, case, 1	1 185
Ag. imp., pkgs.	8 134	Sew. mach., case, 1	6 170
		Ag. imp., pkgs.	51 382
		Lub. oil, bbls.	10 150
		Hdw., case, 1	2075 10,848
		Glassware, case, 1	285 1,270
		Coal, tons	36 18
		Grindstones, case, 1	36 18

Porto Rico.		French West Indies.	
	Quan. Val.		Quan. Val.
Pdw., case, 1	1 53	Sew. ma., case, 1	99
Grindstones, case, 1	150 106	Carriages, case, 1	4 700

IMPORTS		Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending January 11, 1881:	
	Quan. Val.		Quan. Val.

Hardware.		McCoy & Saunders.	
	Quan. Val.		Quan. Val.
Case, 1	1 10	Bundles, 165	165
Case, 1	1 10	J. W. Mason & Co.	10
Case, 1	1 10	Wire, coils, 8	8
Case, 1	1 10	Wire rope, coils, 18	18
Case, 1	1 10	T. B. Coddington & Co.	216
Case, 1	1 10	Bundles, 216	216

Case, 1		Order.	
	Quan. Val.		Quan. Val.
Case, 1	1 10	Ore, kilos, 1,000,000	1,000,000
Case, 1	1 10	Wire, coils, 338	338
Case, 1	1 10	Ore, tons, 138	138
Case, 1	1 10	Wire rods, bbls., 141	141
Case, 1	1 10	Pig, tons, 583	583
Case, 1	1 10	Spiegel, bbls., 200	200
Case, 1	1 10	Scrap rails, tons, 199	199
Case, 1	1 10	Scrap rails, case, 216	216
Case, 1	1 10	Scrap rails, bbls., 40	40
Case, 1	1 10	Spiegel, kilos, 285	285
Case, 1	1 10	Scrap, tons, 205	205

Case, 1		Steel.	
	Quan. Val.		Quan. Val.
Case, 1	1 10	Rosbach J. H. & Bro.	183
Case, 1	1 10	Bands, 183	183
Case, 1	1 10	Bundles, 54	54
Case, 1	1 10	Bars, 6	6
Case, 1	1 10	Case, 1	1
Case, 1	1 10	F. W. Moss, Bundles, 162	162
Case, 1	1 10	Bars, 10	10
Case, 1	1 10	James Montgomery, Bundles, 27	27
Case, 1	1 10	Case, 1	1
Case, 1	1 10	Thomas Scott, Bundles, 110	110
Case, 1	1 10	Buck & Manson, Bundles, 150	150
Case, 1	1 10	Drexel, Morgan & Co., Bundles, 190	190
Case, 1	1 10	Winchester Arms Co., Bundles, 19	19
Case, 1	1 10	Sanderson Geo. & Co., Bundles, 13	13
Case, 1	1 10	Woodford W. O., Bundles, 17	17
Case, 1	1 10	Temple & Lockwood, Bundles, 13	13
Case, 1	1 10	Case, 13	13
Case, 1	1 10	Saxton & Seabury, Bundles, 14	14
Case, 1	1 10	Tomlinson Spring Co., Bundles, 60	60

Gales,	Scrap rails, bdl., 40
Cases, 5	Spiegel, kilos., 40
Thos. Taylor	382.450
Cutlery, csk., 1	Scrap, tons, 205
Winchester Arms Co.	
Case, 1	Steel.
Wiebusch & Hilger	Rossbach J. H. & Bro.
Hdw. Co.	Bands, 382

Ores.—We quote: 50 % Brown Hematite, per ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25.

Nails.—Are fairly steady at 3.25¢ rates, usual discount on 200-kg lots and for cash.

Manufactured Iron.—There is nothing new in the movement of articles in this list. Bar has a steady market. The late effort to tone up the market in Pittsburgh has helped

developed as soon as the snow and ice disappear. Bars are held at 2.25 @ 2.30, net, for wholesale transactions. Sheet Iron is stationary, and the cold maintains the demand unusually far into the winter. There are some signs of demoralization in price among the rivet makers, for instance, that are not cheering, but inevitable on the break-up of combinations which have created fictitious prices. It is encouraging to note that the leading Horse shoe Nail manufacturers open the year with confidence at about previous figures, or with slight advance. The Putnam Nail Company have returned to the old list of 25¢ for 88, the same as the Ausable have adhered to, Globe and Northwestern

R. C. HOFFMAN & Co., Iron and Commission Merchants, report the Pig Iron market as follows, under date of January 10: The iron market for the past week has been active for this season of the year, and prices

between which limits any quantity of that class of iron is obtainable. Sheets are in

a respectable amount of work in hand. At Eston the rail mills are running full time. From that establishment 4000 tons of blooms are being sent to the States.

HEMATITES

are steady and not at all likely to retrograde in view of the promising state of the rail trade. Nearly the whole of the furnaces of the West Coast are in operation, and the stocks in reserve are comparatively light. Quotations of the day are:

	No. 1.	No. 2.	No. 3.
Cleator.....	76/	74/	70/
Lonsdale.....	65/	64/	63/
Workington.....	65/	64/	63/
Lowther.....	65/	64/	63/
Moss Bay.....	65/	64/	63/
Harrington.....	65/	64/	63/
Solway.....	65/	64/	63/
Maryport.....	65/	64/	63/
Askham.....	64/	63/	62/

For large parcels these prices are subject to reductions. Several new ventures are being made in the Furness district for raising ore and establishing blast furnaces. In one of these, Mr. Massicks, who is already well known and largely interested in the district, is concerned. His new undertaking, combined with the present one, will probably make his responsibilities second only to those of Mr. Smith, of the Barrow Iron and Steel Works.

THE ANTHRACITE QUESTION.

which I recently thought it my duty to bring before your readers, does not appear to be likely to drop through. On the contrary, the proceedings of the "Fog and Smoke" Committee, which is pushing its aims with most determination, seems resolved to make most strenuous efforts to save us from both those horrid annoyances. I don't quite know how the worthy gentlemen propose to "work out our salvation" in these respects, but I learn that they deem anthracite coal the best and most likely means of effecting it. They are endeavoring to organize an exhibition of smoke-consuming stoves and of anthracite fuel at the South Kensington Museum, and would, I have not the slightest possible doubt, be glad to have the opportunity of exhibiting a selection of American base burner or other good stoves. At all events, were I an American stove manufacturer, I would lose no time in shipping a few samples, either to my agent here or to the committee direct, with full instructions as to the use of proper fuel—and the like. The offices of the committee are at 44 Berners street, Oxford street, London W. Anthracite coal companies might do likewise, with a statement as to the approximate prices at which they estimate they could deliver the coal in London. In all seriousness, I consider this movement affords your stove and anthracite men a chance which may not speedily recur. South Kensington, you may know, is in the very heart of fashionable London, in a region where reside the largest number of the most wealthy and the most capricious persons in the world. Once a few leaders of fashion took up an American stove the thing would be accomplished, and your makers would have a mighty task to supply the demand which would certainly arise. A "conference" on the subject will take place at the Mansion House (the official residence of the Lord Mayor, and the center of civic life in the "city" proper) on January 7th. At the last meeting the agent of an American house (making the "Crown Jewel," I believe) was present and enlightened those in attendance by the apparent ease with which he kindled a fire of anthracite coal in an ordinary open fire-grate. Although much has been written and spoken about

as carried out by the Thomas-Gilchrist process, I do not remember that the opinion of the veteran inventor of the foundation of all pneumatic steel-making has been published up to this time. I allude, of course, to Sir Henry Bessemer himself, who is quite alive to all that is going on in the metallurgical world, albeit he himself has long since retired from business, as the word is generally understood. I am now, I think, in a position to state, via a "friendly medium," that Sir Henry has an excellent opinion of the basic method of working, and that he hopes and believes it will attain an important measure of success. At the same time, I understand, he deems it quite possible that the best results will always be found to follow from the employment of the best raw material. From this I infer that Sir Henry would argue that the use of Swedish pig in the converter would always give a better and purer steel than the use of hematites, and these, again, better steel than the converting of ordinary pig iron. There is some reason in this line of argument, and it would be highly interesting to learn the full text of Sir Henry Bessemer's thoughts on the subject. This, however, we are not likely to do, as I am informed that the veteran metallurgist has a strong objection to speak or write on dephosphorization, lest it might be supposed that he might approach the question from an interested standpoint. He, therefore, prefers not to touch the subject at all in a formal way. I believe, nevertheless, the above embodiment of his ideas is quite correct.

FOREIGN.

FRANCE.

(*Moniteur des Interests Matériels.*)
PARIS, Dec. 26, 1880.—Metals.—The market has been but moderately active, and, with the exception of Copper, all metals have been weak and declining. We quote at the close Copper—Chili Bars, 167.25 @ 167.75 francs the 100 kilos; Ingots and Slabs, 166.25; Be t Selected, 168.75; Corocoro Ore, 166.25. Tin.—Banco, 250; Biliton, Straits and Australia, 247.50 and English, 247.50. Lead, 37 @ 37.50; and Spelter, 41 @ 41.50. Iron.—There is no longer any doubt about the revival in this branch of trade. For some three weeks past purchases have been heavy, and at rates satisfactory to the producer. Merchant iron has also advanced to 35.50 @ 36 francs. Rails of 20 kilos to the meter are quoted at 25 @ 26 francs. Works in the Haute-Marne are very busy; business for immediate delivery is active, and they now prepare for deliveries after January 1 next. Most of our forges are backward in their deliveries; the foundries have about as much work on hand as the forges. Prices have risen between 5 and 15 francs per ton. In St. Maurice and Moselle, at the North end in the Pas de Calais activity is great. Coal on the other hand, has been moving off in comparatively moderate quantities, and prices are ill supported. The business one is a hand-to-mouth trade, although the shipments from St. Etienne for the week have still been considerable.

BELGIUM.

(*Revue Universelle.*)
BRUSSELS, Dec. 26, 1880.—Iron.—The iron situation in this country has gone on improving. There are so many adjudications going on that prices

are upheld with ease at present rates. Luxembourg Pig Iron is worth 5 francs; English Moulding, 6 francs; Merchant Iron, 12 francs; Sheets, 15, and ditto thin 25 francs per 100 kilos. Continual fluctuations have ceased and prices begin to settle down to a firm level. Business is flowing in from all quarters, a good many orders have arrived from Spain, Italy, Roumania, and especially from France. All these commands are, however, more exclusively for railway material. The year is thus brought to a close under much more favorable auspices than were apparent only a month ago, and this augurs well for the spring trade, provided speculation does not step in and hamper the legitimate expansion of consumption by its ill-timed interference, as was the case early in the year. It is now evident that at current rates activity can be kept up for many months to come, while any precipitate advance would again lead to hesitation on the part of consumers. Coal.—The inundations which desolate at present many active centers of industry do a great deal of harm to the coal trade, which already suffered from too mild weather. The consequence is great weakness in prices.

GERMANY.

(*Borsenhalles.*)

HAMBURG, December 24, 1880.—Iron.—We receive the following from Dortmund: "Gradually a real revival has taken place in the iron trade here, especially in Pig, Bessemer in particular, in which there is a very firm feeling, with an advance of a couple of marks per ton. Bessemer Pig has even become quite scarce. Merchant iron is also tending upward, but the advance is not yet as thorough as it is in Pig; this so far as rolled is concerned. Forged sheets, &c., will, of course, have to follow suit. People here are now of opinion that we are on the eve of a general revival in iron industry. I may be permitted to add that I trust the advance to come may not be as precipitate as one as it was a year ago. Coal.—Prospects in this branch are less flattering. The weather being damp and mild, the demand for household has diminished very much, and inundations have flooded many works. Navigation on the Rhine has also been interrupted. Add to this the near approach of the holidays and a decline in Coal seems to impend, unless cold weather should now come to its rescue." In the Moselle and Sarre region the improvement, in sympathy with what is happening in France, is making good progress in iron matters. Rolled iron has been advanced in price 5 marks per ton. Coal there is less active. The November sales sum up 466,186 tons, against 429,400 in November, 1879. In Upper Silesia the demand for Pig iron has become brisker; some rolling mills have made good sales of their products, and are now ready to buy Pig iron more extensively. Coal has been weak there and dull, but no actual decline has taken place. Metals are inactive and unchanged.

AUSTRIA.

(*Austrian Trade Journal.*)

VIENNA, Dec. 26, 1880.—Iron.—The market in Austria-Hungary has been gaining in firmness most decidedly, and there is no difficulty now in obtaining combination rates. The demand for Pig iron has become more lively, and various blast furnaces not belonging to the combination have been able to sell all they can produce during the first six months of the coming year a little below combination rates, while for immediate delivery they have done a little better. More buyers than before are now on the market, and more buyers than they were in November, for some few local orders have dropped in. The Francis Joseph Railroad, the Bohemian, Western and Prague-Dux have together ordered some 10,000 tons. Iron has been quiet, in consequence of the lateness of the season. Prices are unaltered. We quote: Pig, 44 @ 52 florins; Merchant Iron, 105 @ 114; Sheets, 155 @ 185; and Pillars, 103 @ 125. Metals have, on the whole, been quiet and unaltered. We refer for quotations to our previous report.

EAST INDIES.

(*Schmidt, Kustermann & Co.*)

PEHANG, Nov. 12, 1880.—Tin.—Since reporting on October 28 the market opened at \$26.00 @ \$26.50, but soon improved to \$27.55 upon receipt of better advices from Europe and America. Since then the demand has subsided somewhat, causing sales to be made at \$27.15 @ \$27.40 per picul, and toward the close we hear of a small lot procured as low as \$27.20. Receipts have been 11,000 piculs, of which 7,200 piculs were taken for Europe and America, and 3,800 by natives. There were consigned to Singapore to be sold there 200 piculs. Exchange has gone on declining, receding from 3/4 @ 3/4 for four months. Bank drafts on London. 12.8.—November.—The price has continued to rise, and demand for tin both for Europe and America, and since the foregoing was written quite an advance has taken place. Our market opened at \$27.15, and then by degrees improved to \$27.55, since which a relapse took place, causing the price to recede to \$28.10. Receipts during the fortnight have been 7,000 piculs, while the takings were 3,300 for Europe and America, and 3,700 for India and China. Stock in hand 200 piculs. Exchange has continued to decline, and closes at 3/4 @ 3/4.

(*Rautenberg, Schmidt & Co.*)

SINGAPORE, Nov. 30, 1880.—Tin.—A good business has been transacted. The price has risen from \$27.75 to \$28, but closed more quiet at \$27.75. Exchange has fluctuated around 3/4 for six months' private drafts.

(*Gilliland, Wood & Co.*)

SINGAPORE, Nov. 30, 1880.—Tin.—About 300 tons have been taken, chiefly for the United States, at \$28 @ \$29 per picul, without discount. The demand for tin both for Europe and America, and since the foregoing was written quite an advance has taken place. Our market opened at \$27.15, and then by degrees improved to \$27.55, since which a relapse took place, causing the price to recede to \$28.10. Receipts during the fortnight have been 7,000 piculs, while the takings were 3,300 for Europe and America, and 3,700 for India and China. Stock in hand 200 piculs. Exchange has continued to decline, and closes at 3/4 @ 3/4.

The Pittsburgh Exposition, which had a troubled existence at its start, seems at last to have reached a position that secures its future. The report just made shows a prosperous condition of affairs. The income for the past year was \$88,614.97. The amount expended for permanent improvements and repairs to buildings the past year was \$48,464.40. The following statement shows the number of admissions to the exhibitions of 1877, 1878, 1879 and 1880:

	1877.	1878.	1879.	1880.
On 25-cent tickets.	70,988	91,314	114,475	147,948
On 15-cent tickets.	19,484	16,070	17,127	20,490
On railroad tickets.	15,771	20,087	43,819	60,750
On special tickets.	2,378	4,589	15,473	6,549
Exhibitors and employees.....	10,759	20,077	31,043	64,001
Totals.....	113,380	152,610	222,337	309,738

The increase of admissions in 1880 over 1879 was 84,401. The average daily attendance at the Exposition of 1877 was 3905; of 1878, 5366; of 1879, 6016; of 1880, 9173.

We learn through J. & W. Seligman & Co., local banking agents for Lessees, that a large corps of engineers and mechanics left Havre last week for the Isthmus of Panama direct, to complete the surveys for the canal. They say that the first and second installments having been paid in, the company have a working capital of \$15,000,000, and they regard the prospects as most encouraging. A tour of inquiry among shipping merchants and private bankers, however, fails to show that the enterprise in any degree enlists the popular sympathy, the Nicaragua project being recognized as more distinctly American. As stated by Señor Jerez, the Nicaragua Minister, though not

officially, "an interoceanic canal would be merely an extension of the coast line of the United States."

The Tehuantepec Ship Railway Project.

Captain James B. Eads has returned to New Orleans from Vera Cruz, where he has successfully consummated some very important negotiations, and received from the Mexican government the most liberal concession it has ever granted. It gives him the right to construct the ship railway on such line as he may determine, and he is to be entirely untrammelled in the plans and execution of the work, which is to be commenced within two years from the date of the grant and completed within twelve years. The concession grants a right of way across the Isthmus half a mile in width, which width is increased, wherever stations are required, to one mile. It gives him the right to improve such rivers and harbors as he may deem proper, and to collect liberal tonnage tolls from vessels entering them. It permits him to collect \$5 per cubic meter of the displacement of each vessel transported on the railway; the amount of tolls to be determined in the following manner: The greatest length and greatest width of the vessel, measured at the surface of the water, are multiplied by the greatest depth of immersion, and for each cubic meter of fraction of a meter contained in such parallelepiped of these dimensions, he is entitled to charge \$5 toll. He is also entitled to charge \$15 for each passenger on the ship and one per cent. on the value of gold or silver coin or bullion or precious stones; and, in the event of such valuables not being declared to his agent, to collect 10 per cent. on their value, and to detain the ship until the sum is paid. He is also entitled to such compensation as may be agreed upon between his agents and any vessels in transit, for dockage, repairs or cleaning when needed by them, and to operate a telegraph line and an auxiliary freight and passenger railway line in connection with the ship railway. In addition, the government grants him a subsidy equal to 1,000,000 acres of public lands, to be located on the Isthmus or elsewhere, in aid of the construction of a suitable harbor on the Pacific Ocean. It also gives him the right to consolidate the Tehuantepec Railway, now being constructed by M. Learnard and others, with the ship railway on such terms as may be agreed upon between them, and in such event, the location of the Tehuantepec Railway may be altered as desired by Capt. Eads.

The Tehuantepec Railway Company has a subvention amounting to about \$1,500,000, to be paid by the Mexican government in custom-house certificates, and has also a large land grant. In case of the acquisition of this railway its obligations to the Mexican government are to cease and determine, and the subvention would then attach to the ship railway. The duration of the grant is 99 years, at the termination of which the government is to take possession of the works and pay two-thirds of their value. Capt. Eads, on his part, agrees to transport the ships, property and troops of the Mexican government without compensation during the existence of the grant. He has the right to export, free of all duties, all moneys required to pay dividends or to purchase materials of any kind for the use of the road, and likewise to import, free of duty, during the entire period of the grant, all materials, coal and articles of every kind required for the construction, repair and operation of the road.

The most remarkable feature, however, of this liberal concession is that which gives to Capt. Eads the right to hypothecate the revenues of the road to any other government which he may select to aid him by money or guarantees in its construction. It gives to such government, in case of any default on the part of the company to such government, the right to intervene through the courts of Mexico and have receivers appointed to insure the faithful application of its revenues in accordance with the terms that may be agreed upon. No hypothecation or conveyance of the grant or of the works themselves, or of the lands, however, can be made to any foreign government without invalidating the concession.

The permission to secure the co-operation of another government is intended by the Mexican government to give to the United States the privilege of co-operating with Mexico in aid of the construction and control of the works, as this is regarded by the leading men in Mexico as the American route across the Isthmus, and the one in which these two Republics are most vitally and directly interested. The route across Panama, which is distant 1200 miles from Tehuantepec, is called in Mexico the French or European route. Ships from New York to San Francisco would save about 1500 miles by going by way of Tehuantepec instead of by Panama. The one route is through the Gulf of Mexico and the other through the Caribbean Sea. From the mouth of the Mississippi to California by Tehuantepec is 2300 miles less than by Panama.

The tolls which Capt. Eads is allowed to charge are nearly three times as great as those which are allowed in the Colombian grant to the De Lesseps party. This is done for two reasons: First, the railway across the Mexican Isthmus will need to be about 112 miles in length, as against 45 miles at Panama; and, second, the great saving in sea distances in favor of Tehuantepec will justify much higher rates of toll.

The Exhibition Commissioners.—Spicy discussions have characterized the sessions of the International Fair Commission thus far through the present week. On one occasion there were about eighty delegates assembled in the Governor's room of the City Hall, with many others, capitalists and business men in attendance. The question was on the adoption of the report of the Executive Committee. Ex-Mayor Cooper persisted in raising the "previous question," or other matters which appeared to be irrelevant, but which, several endeavored to explain, would come up in due order. But Mr. Cooper was irrepressible, apparently under the conviction that he represented a formidable constituency of disaf-

ected members who must be appeased. As gentlemen who had come from remote parts of the country saw the time wasted in profitless discussion, the feeling rose almost to the pitch of exasperation. Mr. Wm. A. Cole, successor to the old lard exporting firm of Wilcox & Co., at last took occasion to intimate that Mr. Cooper would do well to resign from the committee. Gov. Crawford, of Kansas, openly accused Mr. Cooper of bad faith. Mr. Haines, acting chairman of the committee, added that his resignation would be gladly accepted, and Mr. Cooper resigned.

Barb Wire Fencing.

The Pittsburgh Times, speaking of the situation in the wire fence business since the decision of Judges Drummond and Blodgett, says:

Oliver Brothers and Phillips' wire mills are closed. The cause of this is that their principal customers—the barbed wire fence manufacturers—have stopped the manufacture of that article for the present. The cause of this stoppage is a decision rendered a few days ago by Judges Drummond and Blodgett, of the United States Circuit Court, upon a case which came before them at the July term of court, 1880, at Chicago. It is alleged by other barbed wire fence manufacturers that in these reissues the meaning and scope of the original patent is changed and enlarged, particularly with regard to a patent on a device originally issued to a man named Hunt. In the reissue obtained by Messrs. Washburn & Elwood, the patent is made to cover everything in the shape of a barbed wire fence. In short, the idea is patented. Upon this patent the suit between the Washburn & Elwood companies and other manufacturers hinged. The court recognized the patent as valid in its decision a few days ago. Hence all the barbed wire fence manufacturers are closed. The case will be either carried to the United States Supreme Court, or else the other manufacturers will have to make some arrangement with the holders of the patent, by which they can continue the manufacture of the fence by paying a royalty upon whatever patents they use. In the event of their doing neither of these, they will have to stop the manufacture of the fence altogether. Matters are at a standstill now, awaiting the arrival of Mr. Washburn, who is on his way home from Europe. Last year there was manufactured in the United States from 15,000 to 20,000 tons of barbed wire fence, enough to fence 200,000 acres of land. The fence has been steadily growing in favor since its introduction. If the patent owned by the Washburn and Elwood companies is allowed to stand, their revenues from royalties will be something immense. There is no barbed wire fence manufactured in this city. Beaver Falls, where there is one factory, is the nearest point. At Johnston there are several concerns engaged in the business. At Joliet, Ill., there are seven or eight; at DeKalb, Ill., two; at Chicago, Ill., five or six; at Burlington, Iowa, one; at Dubuque, Iowa, two; at Des Moines, Iowa, one, and at St. Louis, Mo., one. All of these, except these controlled by the firms mentioned, have been compelled to close on account of the recent decision, which was totally unexpected. As a result of their closing, the wire mills that have been supplying them with wire—among them Oliver Bros. & Phillips, here—have closed. Developments are awaited with great interest.

A Lead Works Declared a Nuisance.

We have given our readers already the result of a trial before the Court of Common Pleas of Allegheny County, Pennsylvania, that involved the injury done farming lands and crops by the fumes and vapors arising from the smelting works of the Pennsylvania Lead Works, near Pittsburgh. The plaintiff had leased a farm near the site subsequently leased to the lead works, to Jacob Wehrle and his son. As soon as the lead works got into operation the effects of the fumes and gases were evident. The land grew poor, while the crops became impregnated with a deadly poison that killed the cattle that ate it. Even Mr. Wehrle's family grew sick, and one of his sons died. These facts were the basis of the suit in the court below, where a verdict was found against the company. Justice Gordon, in this opinion, quotes the words of Blackstone: "So use your own as not to injure another." In a lengthy opinion he declares the lead works a nuisance, and holds that the owners, being experts in the business, should have known what the result of their locating their works where they did would be. Certainly they could not expect the farmer to notify them not to erect their works near his land, as he could not be expected to know what results from the manufacture of lead might ensue to his land. In conclusion, says the justice, "if they (the lead company) were ignorant, if they knew not the consequences which would follow the business in which the company was about to engage, they ask too much of the plaintiff when they require of him a knowledge of their own business, which they themselves did not possess." The decree of the lower court, which was against the lead company, was affirmed.

Business Documents in the Mails.

Judge Freeman, Assistant Attorney General for the Post Office Department, has written an official letter to the Postmaster General which takes the ground that printed commercial papers filled out in writing are legally subject to letter rates of postage, and that, therefore, section 232 of the present postal regulations, allowing such papers as bills of lading, invoices, waybills, insurance documents, deeds, circulars and handbills to pass through the mails as third-class matter, should be annulled as contrary to the law. The statute cited by Judge Freeman as the basis for this opinion is the act of March 3, 1879, which declares that mailable matter of the first-class shall embrace letters, postal cards and all matter wholly or partially in writing, except as therein provided. The department in framing and executing the controverted postal regulation, has held that one of the statutory "exceptions" was intended to permit any or all "writing not in the nature of per-

sonal correspondence" to be placed upon printed matter without subjecting it to letter rates, and in support of this view has referred to the precisely similar regulation adopted by the Universal Postal Union, under which all such commercial papers as those above mentioned can be sent through the mails of the United States to foreign countries as third-class matter. The point has also been made that it is better to admit bulky papers of this class to the mails at present rates, which, though low, still pay a profit to the government, than practically to exclude them by imposing a rate so high as to divert their carriage to the express companies, &c. The legal point raised by the Assistant Attorney General will be submitted to Postmaster General Maynard for his decision.

Strike of the Mill Miners at Wheeling.

At a convention of the mill miners of Wheeling, on Saturday afternoon, 1st inst., the following resolutions were passed:

1. That we make a demand for one-half cent per bushel of an advance, to take effect on Tuesday, January 4, 1881, or a scale signed for one year, based on Wheeling nail card, with 2 1/2 cents as the lowest step, and to advance 6 1/4 cents for every advance of 25 cents per keg in nails.
2. That if this advance is not conceded on Monday next, the 3d day of January, 1881, that all the mill miners of the Ohio Valley district suspend mining until the 2 1/2 cents or the said scale is conceded.

In accordance with this resolution all the mill miners, to the number of 4000 men and boys, went out on a strike. All the mill owners declare their intention not to accede to this demand of the miners, and the Belmont, Benwood, Top, La Belle, Bellaire and Laughlin mills will close down. The Etta will concede the advance to the miners, and the Riverside will shut down all their departments except the bar mill, and will purchase coal to run the latter.

The following is the scale which prevailed during 1880:

When nails per keg are between \$2.50 and \$3.25, mining shall be 5 cents per bushel.	
\$3.25 to \$4.25.....	5 1/2 cents.
4.25 to 5.25.....	6 1/2 "
5.25 to 6.25.....	7 1/2 "
6.25 to 7.25.....	8 1/2 "
Price of slack to be one-fourth of the price of clean coal.	

Nails are now below \$2.50, hence the above scale yields at present 2 cents per bushel for mining.

The following is the scale proposed by the miners to prevail during 1881, or one-half cent advance for no bounded period:

When Wheeling nail card rate is \$2.75, mining shall be \$2.50 per hundred bushels.	
\$3.00, mining to be.....	\$2.66 2/3
3.25 " ".....	2.83 1/3
3.50 " ".....	3.00
3.75 " ".....	3.16 2/3
4.00 " ".....	3.33 1/3
4.25 " ".....	3.50
4.50 " ".....	3.66 2/3
4.75 " ".....	3.83 1/3
5.00 " ".....	4.00

The above scale will yield at present card rate of nails 2 1/2 cents per bushel. The scale for 1880 was made on inflated prices, hence when the price fell to the bottom mining fell with it. The miners are asking one-half cent advance, or the above scale.

Railway Construction in 1880.—The Railway Age, of Chicago, has compiled the following figures, showing the mileage of track actually laid down in the different States during the year 1880:

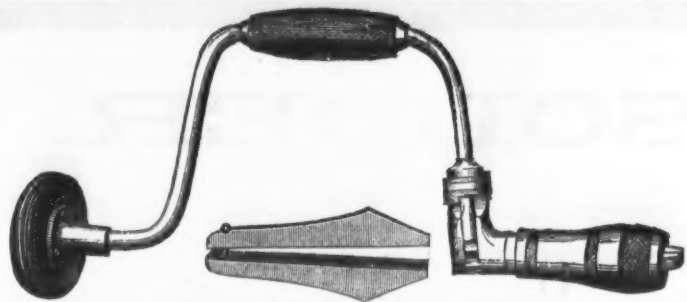
States.	No. lines.	Mileage.
Arkansas.....	1	70.00
Alabama.....	1	20.00
Arizona.....	1	200.00
California.....	1	3.00
Colorado.....	13	405.50
Connecticut.....	1	35.70
Dakota.....	13	680.85
Delaware.....	1	1.00
Florida.....	8	36.00
Georgia.....	5	26.50
Illinois.....	12	342.00
Indiana.....	8	161.00
Iowa.....	19	445.39
Kansas.....	10	344.50
Kentucky.....	2	97.20
Louisiana.....	2	3.00
Maine.....	1	41.11
Maryland.....	3	41.11
Massachusetts.....	3	41.11
Michigan.....	10	288.75
Minnesota.....	6	110.60
Missouri.....	8	257.75
Montana Territory.....	1	65.50
Nebraska.....	10	385.40
Nevada.....	2	60.00
New Jersey.....	4	56.00
New Mexico.....	3	519.55
New York.....	3	31.34
North Carolina.....	3	49.00
Ohio.....	11	585.00
Oregon.....	4	206.50
Pennsylvania.....	16	628.50
Rhode Island.....	1	7.00
South Carolina.....	3	31.00
Tennessee.....	3	84.00
Texas.....	13	628.50
Utah.....	1	85.22
Vermont.....	1	36.00
Virginia.....	4	247.00
Washington Territory.....	8	81.00
West Virginia.....	2	26.00
Wisconsin.....	15	235.84
Total.....	234	7,907.31

It is likely that returns not yet received will swell the total to 7500 miles.

The California freight business, as we learn from one of the principal shippers, is now divided between the ocean clipper and the Pacific railroads, in fair competition. There is no ill-will manifested. Our informant says the economy of rail will always secure for the ocean route cheap goods, the same as the Hudson river sailing vessels still take the brick, stone, ice, etc., despite the railroads. Rates by sea continue to advance.

It is announced that the Cincinnati Street railway Company controlling the street railway system of Cincinnati, contemplate introducing the wire-cable system in use in San Francisco, doing away with horses. The cable runs under ground, on the endless chain system, and is operated by stationary engines. It is to be tested in Gilbert avenue, and if found practicable, used generally.

A new firm, Messrs. Warner, Walduck & Co., are making arrangements for carrying on the manufacture of steel rails by the Thomas-Gilchrist process at Carlton, near Stockton, Cleveland district, England.



Though we have occupied this identical space in *The Iron Age* for more than twelve years, and though we have been the leading Bit Brace manufacturers of this country during all that time, we have seldom spoken of it in our advertisement, for the reason that all the leading dealers were supposed to know it. Since we first put

THE BARBER IMPROVED BIT BRACE

on the market, at least a dozen patent braces have run their race through the stores and junk stores, and are now forgotten. It is true, some of them died violent deaths, but most of them perished from constitutional weakness. We do not offer to meet competition, as no one else can make our Brace, and we have nothing to compete with. Others might if they would make their braces of steel, but it is much more expensive, and no one can tell the difference until the brace is put into use. All of our Nickel-Plated Braces are made of rolled steel, with forged steel jaws, which will never wear out. We formerly made malleable iron jaws, which in time wore out. All such we will now replace with steel for 25 cents per pair. They are all one size and will always fit. Our Ratchet Brace at the present time has no competitor in the market. Dealers who sell other styles of braces will find it to their interest to buy their stock of ratchets from us.

The price of Barber Braces has not been changed for many years, and we do not anticipate any variation in the near future. Thanking our customers for past favors, we now solicit their future orders.

MILLERS FALLS CO.,

74 Chambers Street, New York.

HEATON & DENCKLA HARDWARE CO.,

Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
H. M. MYERS & CO.'S Shovels, Spades and Scoops.
STEELE & SONS' Wrought Handle Sad Irons.

EXCELSIOR MILLS, Genuine Turkish Emery, BROWN & BRO.'S Brass and Copper Wire, Rivets, Spoons, &c.
GAYLORD MANUFACTURING CO.'S Tilt, Chest and Cupboard Locks.

AMES' Genuine A Chester Emery.

COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
AMERICAN MACHINE CO.'S Fluters, &c.
STUART, PETERSON & CO.'S Tinned and Enamelled Ware, &c.
HUSSEY, HOWE & CO.'S Bar & Sheet Cast Steel.

Also a large line of Heavy and Shelf Hardware.

NATIONAL Horse Nail Co.

MANUFACTURERS OF
FINISHED
[BRIGHT OR BLUED]

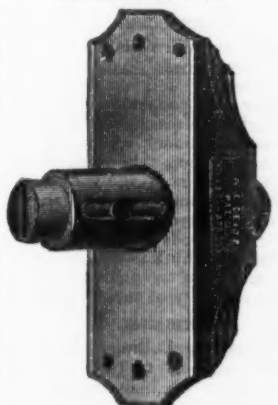


These nails are made of the best brands of NORWAY IRON, and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO.,
VERGENNES, VT.
DURRIE & McCARTY, Agents,
No. 97 Chambers St., New York

A. E. DEITZ,
(Successor to Barnes & Deitz.)
Manufacturer of
Store Door Locks, Night Latches, Padlocks, Drawer Locks, &c., with Flat Steel Keys.

EXTENSION TUBE



STORE DOOR LOCK, No. 184.

Durrie & McCarty, Agents,
97 Chambers & 81 Reade Sts., New York.

Established in 1839.

Formerly L. & A. G. Coes.

L. COES & CO.

Manufacturers of L. Coes'

GENUINE IMPROVED AND MECHANICAL

Patent Screw Wrenches

JUNE 26, 1866,
MARCH 23, 1869,
REISSUED 1870.

NOVEMBER 10, 1863,
FEBRUARY 23, 1864,
REISSUED JUNE 1, 1869,
IMPROVED AUG. 1, 1877.

The back thrust when in use borne by the SHANK instead of the Hand's
None genuine unless stamped "L. COES & CO."

WORCESTER, MASS.

Warehouse, 97 Chambers St. & 81 Reade St., N. Y.
DURRIE & McCARTY, Sole Agents.

The 1881 Pennsylvania Lawn Mower.

OUTSTRIPS ALL COMPETITORS. PREMIUMS TAKEN OVER ALL OTHER MOWERS.

EVERY MACHINE WARRANTED TO WORK AS REPRESENTED.



Points Claimed as being Meritorious;

The lightest; runs more easily; cuts longer grass; requires less repairs; is more durable; cuts more smoothly; don't require sharpening once where others do half a dozen times.

1881 REDUCED PRICE LIST.

Width of Cutter.	Style of Driving Wheel.	Power Required.	Weight.	Price.
10 inch.	8 inch.	A Child.	30 1/2 lbs.	\$13.00
12 "	8 "	A Lad.	33 1/2 "	15.00
14 "	8 "	A Lady.	36 "	17.00
16 "	8 "	One Man Size.	38 "	19.00
18 "	8 "	"	41 "	21.00

NEW MACHINES

For Cutting Long Grass

15 inch, 10 1/2 inch Driving Wheels, 6 1/2 inch.	
Cylinder, Man Size, 48 lbs.	\$20.00
17 inch, 10 1/2 inch Driving Wheels, 6 1/2 inch.	
Cylinder, Man Size, 51 lbs.	\$22.00

QUAKER CITY 10-INCH LAWN MOWER, - - List \$11.00

The QUAKER CITY guaranteed the best Mower for price manufactured.
Discount to the trade.

For Sale By

LLOYD, SUPPLEE & WALTON, Philadelphia.
DURRIE & McCARTY, New York.
AMES PLOW CO., Boston, Mass.
PRATT & CO., Buffalo, N. Y.
SIMMONS HARDWARE CO., St. Louis, Mo.
HAMILTON & MATTHEWS, Rochester, N. Y.
MARKLY, ALLING & CO., Chicago, Ill.

DUCHARME, FLETCHER & CO., Detroit, Mich.
LOCKWOOD, VANDORF & TAYLOR, Cleveland.
WM. FRANKFURTH & CO., Milwaukee, Wis.
PRATT & CO., Elmira, N. Y.
LLOYD & CLARKE, La Crosse, Wis.
G. L. FARWELL, St. Paul, Minn.
HART & CO., Louisville, Ky.

ESTABLISHED 1834.

MALLORY, WHEELER & CO.,

NEW HAVEN, CONN., U. S. A.,

Manufacture exclusively a large variety of

DOOR LOCKS, KNOBS, PADLOCKS,

BRONZE DOOR FURNITURE, &c.

Gold Bronze Trimmings in NEW DESIGNS. No extra charge for our NEW IMPERIAL FINISH.

See samples of NEW LINE low priced Reversible Knob Locks, No. 2200, &c. with New Keys and variety of changes.

WAREHOUSES,

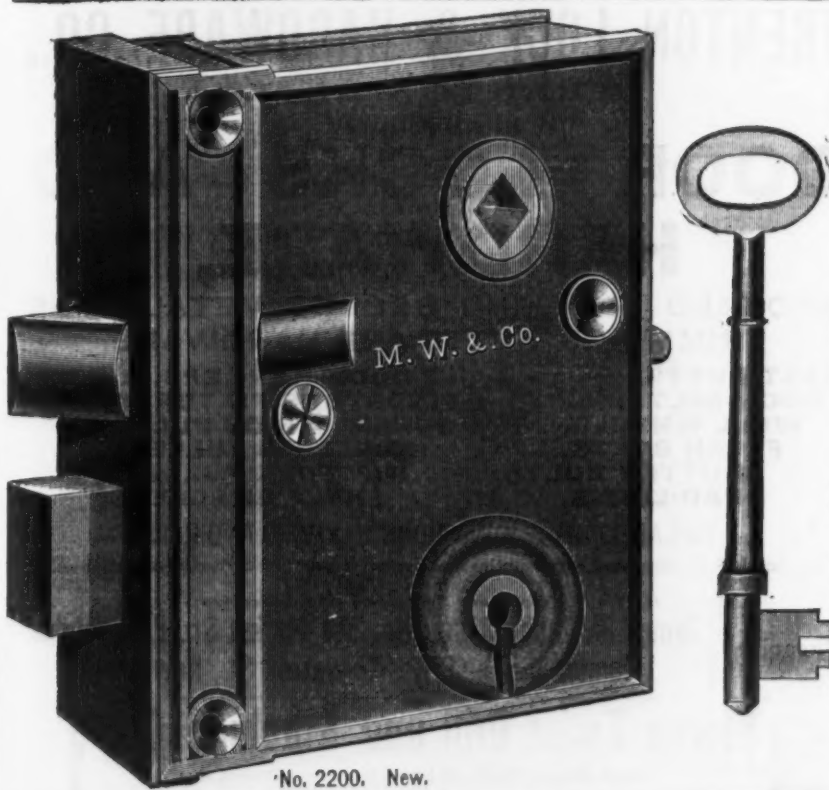
Where samples and a stock of our goods may be found and orders filled upon same terms as from the factory:

SARGENT & CO., No. 37 Chambers Street, New York.

HEATON & DENCKLA, No. 507 Commerce St., Philadelphia, Pa.

OTIS D. DANA, Nos. 22 to 32 Pearl Street, Boston, Mass.

JOHN R. KELSO, Jr., No. 23 S. Charles St., Baltimore, Md.



No. 2200. New.

DAVID HYMES & CO.,

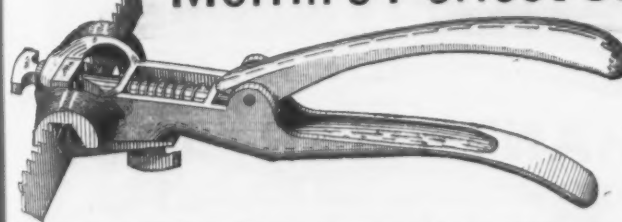
92 CHURCH STREET, NEW YORK,

MANUFACTURERS' AGENTS.

Bargains in Hardware & Cutlery.

Low estimates made on all kinds of SMALL CASTINGS, in the Rough, Japanned or Varnished.

Morrill's Perfect Saw Sets.



For price lists and discounts, address

ASA FARR,

64 College Place,
corner of
Chambers Street,
New York.

RHODE ISLAND HORSE SHOE CO.,

MANUFACTURERS OF

Horse, Mule & Snow Shoes of the Perkins Pattern.

Works at Valley Falls, R. I., and Buffalo, N. Y. Office, 31 Exchange Place, Providence, R. I.
W. CARPENTER, President. C. B. PERKINS, Gen'l Manager. R. W. COMSTOCK, Secretary.

WALKER'S

Forged Horse Shoes,

SHOENBERGER'S

Patent Toe Calks,

Superior to any in market.

Send for prices and samples.

A. BUSSING, General Agent,

4 Warren St., New York.

SCOVILLE'S PATENT

Chilled Hay Fork Pulleys.

(Patented July 10, 1877)

Superior to all others.

The Trade and Jobbers Supplied.

Prices and terms on application.

J. S. & M. PECKHAM,

UTICA, N. Y.

Sole Agents.



BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of

Shank, Socket Firmer and Socket Framing Chisels,

PLANE IRONS.

CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons, who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark, also "Riverlin Works."

Handles for Manufacturers.

SELECTED STOCK,

SEASONED THOROUGHLY,

WELL MADE.

Orders solicited from close buyers who want good work.

RIPLEY MANUFACTURING CO.,

Unionville, Conn., U. S. A.

MANUFACTURERS OF

Common Mouse Traps, Porcelain Lined Lemon Squeezers, Mallets, Rosewood Faucets, Steak Hammers and Housefurnishing Ware.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The Union Needle Works Company, of Middleboro', are preparing the foundation for a new and larger engine. Last year 3,500,000 needles were made. Their force of employees has been recently enlarged.

The Smith Iron Company, of Boston, with a capital of \$124,000, has been chartered. John E. Porter has purchased manufacturing property at Hatfield, including a pistol and blacksmith shop. The pistol works have started up after a few days vacation.

David W. Pond, of Worcester, has recently contracted with the Hartford Engineering Company, which are to manufacture the Buckeye engine, to refit the shops occupied by the Woodruff & Beach Company, at Hartford, Conn., with new machinery. This is believed to be the largest order for iron tools ever placed in Worcester. Mr. Pond's facilities are such that this contract will not interfere with the regular productions of his shop, which is run day and night.—*Boston Commercial Bulletin.*

CONNECTICUT.

An order for 22,000 rifles has been received at the Winchester armory in New Haven, and night work has begun which will last until April 1.

A Hartford company has paid \$50,000 to George Capewell, of Cheshire, for the patent right of a machine for making horse-shoe nails.

The Birmingham Iron and Steel Works have been sold to the Peck, Stowe & Wilcox Company, of Southington.

NEW YORK.

On the 9th instant a fire broke out in the second, third and fourth floors of the large four-story brick building at North Third and First streets, Brooklyn, E. D. A portion of the second floor was occupied by the Welsh Clock Company, and the firm of Lyons & Fellows used the first floor for the manufacture of screws. The building was entirely gutted, and the loss of the occupants will be nearly total. The aggregate loss by the fire was about \$72,000. The report that the Ansonia Clock Company lost property in this fire is denied. The new works for this company are progressing favorably, and will be one-third larger than before. The machinery and tools are already made, awaiting orders, this part of the reconstruction being greatly expedited as a result of former experience. The roof of the principal building will be on by the end of the present month.

The employees of the E. D. Clapp Mf. Co., at Auburn, had a grand ball on New Year's Eve in the new wagon shop on Division street. It was the largest gathering for social purposes ever assembled in Auburn, and was a very fine affair. This company was formed late in the year 1864, and began business in 1865, in a small way, in a building on Mechanic street, attached to the Auburn City Mills. The articles manufactured were thill couplings and fifth wheels for carriages. The demand for their goods became so heavy that in the year 1869 the company built the large brick factory on Water street. Here new lines of goods were added, including joints, king bolts, &c. This building proved inadequate to meet the demands of their increasing business, and in 1874 the large structure at the junction of Genesee and Division streets was erected, and the machinery and office were removed from Water street to that point. In 1875 a further enlargement was made, and an addition 40 x 100 feet was built. In 1878 a large storehouse was placed over the trestle work at the north end of the company's grounds, and a brick building 40 x 80 feet, fronting on Division street, was put up, making a quadrilateral, inclosed by buildings the exterior frontage of which exceeds 800 feet.

We are informed that a new blast furnace is talked of at the Dover mine, Dutchess County, owned by the South Boston Iron Company.

Greenwood Furnace, at Greenwood Iron Works P. O., Orange County, belonging to Peter P. Parrott, has been out of blast since September, 1871. This furnace is the only charcoal furnace in Southern New York or Northern New Jersey, and was built in 1813. Clove Furnace (anthracite) belonging to Mr. Parrott, is in blast, making 180 tons per week.

H. Burden & Son's mill, at Troy, has been shut down on account of lack of water.

NEW JERSEY.

Richardson Bros., saw manufacturers, of Newark, are about to occupy their new buildings, rebuilt since the fire on December 11. They will employ 175 hands in the new shop.

Johnson & Bro., of Newark, file and rasp manufacturers, are doing a large business, and will soon move into larger buildings.

PENNSYLVANIA.

The Combination Iron and Steel Company has recently been organized, with a capital of \$200,000. The directors are John Roach, Charles A. Weed, Samuel Chalfin, New York; Jerome Keelev, Philadelphia, and John B. Roach, of Chester, Pa. The works are located at Chester, and are to manufacture a new product of the furnace, a metal composed of steel and iron. The machinery and frame building of the old Roach mill, formerly at Danville, has been removed to Chester for this company. The mill, when in full operation, will furnish employment to about 200 skilled men, and the capacity of the place will be about 50 tons per day.

Messrs. Haldeman & Ness have bought the Meily Furnace at Middletown, which has been lying idle for some time. The furnace is being thoroughly overhauled and put into shape, and will be blown in as early as possible.

A boiler in the puddle department of the Allentown Rolling Mill exploded on the night of the 6th inst., damaging the mill to the extent of \$20,000, killing the engineer, and fatally wounding several others.

The Greenville Rolling Mill, of Kimberly, Carnes & Co., will be in operation again in a few days.

Rebecca Furnace, of the Kittanning Iron Company, Limited, is making between 200 and 600 tons per week.

Three hundred and sixty-five tons of pig iron were manufactured at the furnace of the Warwick Iron Company for the week ending Saturday, January 1, 1881.

For the month ending December 31, 1880, the nail sales of the E. & G. Brooke Iron Company amounted to 19,485 kegs. The number of kegs made during the month was 21,323. This is the largest output of work ever made by the establishment in any one month. The factory was in operation 24 days, but a part of this time a number of machines were idle, some undergoing repairs and others being compelled to stand on account of the illness of the persons who work them.

The executive committee of the Lehigh and Schuylkill coal exchanges met on December 30, and decided to continue existing prices during the month of January.

All the heating and puddling furnaces at J. H. Boone & Co.'s Stony Creek Rolling Mill have been rebuilt or improved during the past week.

PITTSBURGH AND VICINITY.

By next Monday the majority of the glass-chimney houses, which shut down by resolution of the National Association, will be in operation.

McKee & Bro., glass manufacturers, have completed the foundation of their new gas furnace.

The Atlas Works have received the contract to furnish ingot molds to the Edgar Thomson Steel Works. The contract amounts to \$100,000.

The Lewis Foundry and Machine Company, Limited, is the name of a new manufacturing company formed January 1. The new organization has purchased the property and business heretofore owned and carried on by J. L. Lewis, located on Tenth and Neville streets, South Side. They have also purchased a large piece of property adjoining, and upon which they even now have a large foundry well forward in process of erection. The foundry will front on Neville street, while the rear will be connected by a track with the rear of the roll and machine shop on Tenth street. The active parties of the new organization are J. L. Lewis, chairman, and C. A. Warmcastle, secretary and treasurer.

Thomas Coffin & Co., glass pot manufacturers and dealers in Missouri clay, are still fully employed, having all the orders they can fill.

The Westinghouse Continuous Brake Company have recently ordered from the Patent Plumbago Crucible Company, Batavia, England, one of Fletcher's patent "Annular" hot-air furnaces, for their works in Pittsburgh. The Westinghouse Company have had in use at their London factory a Fletcher's furnace for some months. This is, we believe, the third furnace of this kind shipped to the United States from England.

The machinery is being put in for making barbed fence wire in the branch of the Pittsburgh Hinge Factory at New Brighton, same as they are making in their works at Beaver Falls, and will be ready for operation in a few days. They are introducing a woven wire fence, which they claim is greatly superior to the barbed wire fence. It costs about one-fourth more, but is safer and more durable.

Messrs. Elbel, Gillian & Co., of Allegheny, have secured buildings in Canton, Ohio, for a new malleable iron works, and are now removing the required machinery to that place. When the works are ready to commence operations, about 70 skilled workmen with their families will remove from this city to Canton.

Totten & Co. report plenty of orders coming in at good prices. They have received their fifth order from England for nail machines. There is also an increasing demand for their crusher and pulverizer. The bed plate of the big engine at the American Iron Works, which runs the bar, plate and nail mills, became displaced, and as a consequence those departments have been closed down while the engine is being repaired. The work of repair is a pretty big job, as the huge fly-wheel has to be taken down and then replaced. The addition to the already extensive works which is now being built is to be used as a chain factory. The American Iron Works never stop to take stock, but generally close down a week or two in August for relining furnaces and general repairs.

Isabella Furnace has been dampened down in order to connect with the new Whitwell gas ovens, and casting will not be resumed for several weeks.

VIRGINIA.

The new blast furnace of the Lynchburg Iron Company went into blast on the 13th ultimo. Its erection was begun in April last. The capacity of the furnace will probably be 12,000 tons per year. There is some probability of another furnace being erected.

OHIO.

The Cincinnati Chain Hoist Company, report a large trade during the past year, and they expect this year to do a business 50 per cent. greater. Their chain hoist is made of various sizes, and can be used for light lifting where rapidity is required, or for very heavy lifting. It is constructed upon scientific principles, and is made of the best materials; it is light and portable, easily adjusted, and is adapted for all kinds of lifting. For lifting the copes of large flasks in foundries, this apparatus is just the thing, and would save many a hard strain in lifting. One man could do more with one hand in lifting a cope with it, than four men could do without it, and with much more regularity, thus preventing the falling of sand from the molds, besides a great saving of time in "handing" on and off.

The Riverside Rolling Mill at Cincinnati has been stopped for a short time for repairs, but has started up again, and will in all probability run to its full capacity throughout this year. Mr. T. H. Carruthers, late with Mitchell, Tranter & Co., has recently become identified with this mill, and Mr. T. J. Adams, late with the Gaylord Rolling Mill Company at Portsmouth, is superintendent. The products of this mill are principally standard boiler plate, tank, bar, hoop and angle irons. The office of the company have recently removed to No. 130 West Second street, Cincinnati.

The Revolving Scraper Company, at Co-

lumbus, report that their trade has been fully doubled in the past year, and that at this time they are compelled to run their works day and night to supply the demand for "Columbus" scrapers and other goods. The new works, which they are building for the manufacture of wheelbarrows exclusively, will be in operation by the 1st of March next, which will enable them to turn out 50,000 more wheelbarrows this year than they produced last year. The demand for their wheelbarrows, all of which are supplied with the Jacobs patent wheel, has been immense, and this year the capacity of their works must be increased to keep pace with orders. Road plows are also a specialty of this establishment.

The Farmers Manufacturing Company, at Cincinnati, having found the capacity of their old works on Elm street inadequate to the demands of trade last year for giant riding saws, have removed to Nos. 282 to 290 West Pearl street, which have been fitted up with the most approved machinery, and they are now in full running order. It is thought the demand for giant riding saws will be doubled this year, and the company will run up a heavy stock for the coming season.

Advices from Youngstown state that every puddling furnace in the Mahoning Valley is running, except those of the Hubbard Mill, and that at least 550 tons of metal are used every day by the mills. Almost the entire product of the blast furnaces in the Valley that are running on foundry iron is used up by the mills.

Messrs. Morgan, Williams & Co., of Alliance, are building a combined guillotine and trimming shears for the Danks Rolling Mill at Cincinnati. The tool is intended to cut metal 100 by 1½ inches at a stroke.

The Andrews mill, which is being removed from Niles to Hazelton, will have a capacity, on starting, of 25 tons of muck bar per day. It is the intention to increase the production in a short time.—*Youngstown News.*

KENTUCKY.

The American Wire Nail Company, at Covington, have recently had added to their machinery another nail machine. During the past year over 300,000 pounds of wire nails of various sizes have been shipped from this establishment, and a still larger turnout is anticipated this year. The wire used in these mills is of the very best quality, and from it nails equal to any in the market are produced. Such has been the demand for the goods made in these works that the company think it will be necessary, before the middle of the year, to still further increase the capacity of their works.

INDIANA.

The Indianapolis Rolling Mill Company turned out 22,327 tons of rails for the year ending November 30, being an increase of 3840 tons over any year of its history.

ILLINOIS.

The Judiciary Committee of the Common Council have presented a unanimous report in favor of the erection of pumping works on the South Side, capable of pumping 18,000,000 gallons of water daily.

Blakeslee & Bro., of Du Quoin, have just made a shipment of two car-loads of machinery, consisting of triple boiler front, pulleys, shafting, &c., to James Bell, Ullin, for his new mill, now being built at that place.

The price of bituminous coal in Chicago has been advanced 75 cents per car-load. The retail prices will also be advanced, and dealers predict higher prices for anthracite, as the supply in the city is but 100,000 tons and the railroads have poor shipping facilities.

The Ackerman Lubricator and Cooler Company is a new organization of East St. Louis, with a capital of \$10,000.

The F. C. Wells Steam Pump Works, of Chicago, have recently added several new machines to their establishment, which they run day and night.

All of the barbed-wire factories in Joliet are closed except those of H. B. Scott & Co. and Watkins & Ashley, awaiting the return of Mr. Washburn from Europe.

The Chicago Steel Works last week shipped 13 car-loads of their commodities to different parts of the country, and in 12 hours turned out 40,000 pounds of manufactured steel.

The Jacksonville Sulky Plow Works, with a capital of \$20,000, have been organized. Incorporators, James H. Hackett, A. C. Wadsworth, M. Cahill and William E. Vertich.

The Wilson Sewing Machine Works, at Grand Crossing, began work on Monday morning.

The Carbondale Coal and Coke Company is manufacturing a very fine quality of coke from the celebrated Bryden coal. The company own 108 ovens, and are engaged in making 72-hour coke. The company can produce 108 tons per day.

MISSOURI.

The works of the Helmbacher Forge and Rolling Mill Company, St. Louis, are turning out about 1500 car-coupling links per day, and about the same number of car-coupling pins. They are also manufacturing a large number of axles. Several additional forges are being put up, with a view to increasing the capacity of the works for making coupling links.

The Missouri Car and Foundry Company, St. Louis, are turning out about twelve freight cars a day. Nearly all the work on these cars is done by them.

The St. Louis Iron and Machine Works are manufacturing some cast-iron bolsters and some large screws for the rolls at the rail mill of the Vulcan Steel Company.

MICHIGAN.

Messrs. E. Bement & Sons, of Lansing, manufacturers of plows and agricultural machinery, gave a large reception and banquet to their employees on the 31st of December.

The blast furnaces of Detroit, namely, the Union, Peninsular, Hamtramck, and the Detroit and Lake Superior have been for the past two months making only about three-fourths of their usual output, on account of the impossibility of getting sufficient fuel. The trouble is now nearly over, and the furnaces are making about their usual output.

According to the Chicago Tribune, the Escanaba and Lake Michigan Transportation Company have effected a contract to deliver

SOLDER.

OUR ½ & ¾ SOLDER WE guarantee to contain ½ pure Tin and ½ pure Lead, mixed and cast by the best known processes.

M F

This Solder we confidently believe to be unsurpassed by any Solder now offered to the trade, as it contains a larger proportion of Tin than Lead, and no other metals, thus giving to it a smooth and liquid flow and great tenacity.

SPECIAL MIXTURES

of Solder we make in any proportions specified by the purchaser, guaranteeing every bar to contain such proportions as may be designated.

Our solders never contain any other metals besides pure Tin and Lead, and upon the basis of the raw materials in large lots we always price our solder.

MERCHANT & CO.,

Tin Plates, Metals, Sheet Iron, &c.

PHILADELPHIA.

TRENTON LOCK & HARDWARE CO.,

TRENTON, N. J.

MANUFACTURERS OF

DOOR LOCKS AND HARDWARE,

BRONZED IRON AND BRONZE METAL DOOR TRIMMINGS, BUTTS AND HARDWARE.

CAST BUTTS, DOOR BOLTS, WELL WHEELS, FLUSH BOLTS, SHUTTER BOLTS, PAD LOCKS, BARN DOOR HANGERS, & RAIL, CRINDSTONE FIXTURES, SCREW & SIDE PULLEYS, NOISELESS PULLEYS, HAY FORK PULLEYS, SHELF BRACKETS,

PHILADELPHIA SLIDING DOOR HANGERS AND RAIL.

Having largely increased our facilities and line of goods, we invite the attention of the Trade.

Illustrated Catalogues Furnished on Application.

Agencies. James M. Vance & Co., No. 211 Market St., Philadelphia. James Marshall, No. 48 Warren St., New York.

Morse Twist Drill and Machine Co.,

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill, Beach's Patent Self-Centering Chuck, Solid and Shell Reamers, BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS. DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. B. STETSON, Supt.

EDWARD S. TABER, Treas.

ELBA IRON & BOLT CO., Limited.

MANUFACTURERS OF

MERCHANT BAR IRON,

Skelp Iron, Splice Bars, Railway Track Bolts, Car, Bridge, and Machinery Bolts, Nuts, &c.

We invite the attention of RAILROAD MEN especially to our make of SPLICE BARS and Track Bolts. Using the best brands of REFINED IRON, and paying close attention to the finish of our manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent quality. Our works have been enlarged within a few years; all orders are now executed with promptness; all our work guaranteed.

SEND FOR PRICE LISTS AND INFORMATION TO

ELBA IRON & BOLT CO., Limited, Pittsburgh, Pa.

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Architectural Iron Work.	
Phila. Smelting Co., 12th and Noble Sts., Phila.	31
The Chalmers Spence Co., Foot 5th St., E. R., N. Y.	34
Asbestos Materials.	
Meriam & Morgan Paraffine Co., Cleveland, O.	33
Axles, Springs, &c., Manufacturers of.	
Cook & Sons, Winsted, Conn.	8
Hutchinson & Co., 12th and Noble Sts., Phila.	31
Lambertville Iron Works, Lambertville, N. J.	31
Wurster F. W., Brooklyn, N. Y.	31
Babbit Metal.	
Phila. Smelting Co., 12th and Noble Sts., Phila.	31
Bag Holder.	
Stencel J. R., Sheffield, England.	10
Barb Wire.	
Thorn Wire Hedge Co., Chicago, Ill.	6
Bed Screws.	
Shelton & Co., Birmingham, Ala.	24
Bellows, Manufacturers of.	
Scott Geo. H., Chicago, Ill.	10
Belt (Belts).	
Bevin Bros. Mfg. Co., Easthampton, Conn.	28
Belt Hooks.	
Browning & Co., 55 Chambers, N. Y.	24
Belting, Makers of.	
Alexander Bros., 415 N. 3d, Philadelphia, Pa.	33
Gardner & Co., 23 Chambers, N. Y.	24
N. Y. Belt and Packing Co., 37 Park Row, N. Y.	13
Peck & Demis, Cleveland, O.	34
Bicycles.	
Pope Mfg. Co., 65 Summer, Boston.	38
Bird Cages, Makers of.	
Guthrie G., 12th and Noble Sts., Phila.	31
Jandeman & Co., 23 Pearl, N. Y.	3
Maximilian John, 247 and 248 Pearl, N. Y.	7
Bit, a d. Braces, Manufacturers of.	
Iron W. A. & Co., 23 Chambers, N. Y.	24
Millers Falls Co., 74 Chambers, N. Y.	21
Blind Plant Holders.	
Boyle & Co., Brooklyn, N. Y.	24
Blocks, Tackles, Makers of.	
McMillan Wm. H. & Co., 113 South, N. Y.	38
Providence Block Works, Providence, R. I.	29
Boiler Coverings.	
The Chalmers Spence Co., Foot 5th St., E. R., N. Y.	34
Boilers, Steam.	
Harrison Boiler Works, Philadelphia, Pa.	24
Bolt Casters.	
Cleveland Machinery Depot, Cleveland, O.	35
Howard Iron Works, Buffalo, N. Y.	39
Sellers Wm. & Co., 23 Chambers, N. Y.	24
Wiley & Russell, Greenfield, Mass.	25
Bolts.	
American Bolt Co., Lowell, Mass.	34
Coleman Bolt Works, Philadelphia, Pa.	24
Bracket Woods.	
Bayner J., 11 Cannon, N. Y.	18
Brass, Manufacturers of.	
Ansania Brass and Copper Co., 19 Cliff, N. Y.	23
Bridgeport Brass Co., 23 Chambers, N. Y.	24
Brown & Bros., 23 Chambers, N. Y.	24
David John & Sons, 100 John, N. Y.	3
Holmes, Booth & Co., 23 Chambers, N. Y.	24
Manhattan Brass Co., 1st Ave. & 27th St., N. Y.	2
Merchant & Co., 407 Market St., Phila.	28
Phila. Smelting Co., 12th and Noble Sts., Phila.	31
Plume & Alwood Mfg. Co., 30 Chambers, N. Y.	24
Rome Iron Works, Rome, N. Y.	2
Seavill Mfg. Co., 415 N. 3d, Philadelphia, Pa.	33
Waterbury Brass Co., 205 Broadway, N. Y.	2
Brass Foundries.	
Phila. Smelting Co., 12th and Noble Sts., Phila.	31
Reeves Paul S., Philadelphia, Pa.	31
Brass Wire Cloth.	
Howard & Morse, 45 Fulton, N. Y.	6
Bridge Builders.	
Moseley Iron Bridge and Roof Co., 5 Day, N. Y.	2
Bucket for Chain Pump.	
Crosby A. D., 23 Chambers, N. Y.	24
Butcher and Sheep Knives, Manufacturers of.	
Wilson John, Sheffield, England.	10
Bulls and H. American Spiral Spring Bolt Co., 23 Beekman, N. Y.	38
New England Bolt Co., 30 Platt, N. Y.	27
Sabin Mfg. Co., 23 Chambers, N. Y.	24
Stanley Works, New Britain, Conn.	8
Union Mfg. Co., 30 Chambers, N. Y.	24
Carriage Builders.	
Shelton & Co., Birmingham, Ala.	24
Townsend, Wilson & Hubbard, Philadelphia, Pa.	34
Carriage Hardware.	
Cowles & Co., New Haven, Conn.	33
Smith H. D. & Co., Plainville, Conn.	12
The E. D. Clark Mfg. Co., Auburn, N. Y.	8
Carriage Springs.	
Deer Spring Co., Hulton, Pa.	2
Carr Axles.	
Goberts A. & P. & Co., 205 E. 4th, Philadelphia, Pa.	5
Casters.	
Phoenix Caster Co., Indianapolis, Ind.	18
Casting Iron.	
Cheney S. & Son, Manlius, N. Y.	25
Elwell Hardware Co., Bridgeport, Conn.	24
Hopson & Brannard, Wethersfield, Conn.	7
North Bros., Philadelphia, Pa.	24
Casting Steel, Manufacturers of.	
Chester Steel Castings Co., 27 Liberty, Phila.	31
Euroka Cast Steel Co., Chester, Pa.	38
Flag Stanley G. & Co., Philadelphia, Pa.	38
Pittsburgh Steel Castings Co., Pittsburgh, Pa.	33
Caulking Irons.	
Carver John, 44 North 3d St., Brooklyn, E. D., N. Y.	3
Chalmers, Monahan & Co., 23 Chambers, N. Y.	24
Bradley & Co., 286 Richmond St., Phila., Pa.	4
Round David, Cleveland, Ohio.	25
Chains, Sash.	
Morton Thome, 6 Elizabeth, N. Y.	34
Chisels, Manufacturers of.	
Buck Bros., Millbury, Mass.	21
Clatchey, F. & Co., Cincinnati, O.	21
Oesterline W., Cincinnati, O.	21
Chisel Springs, &c.	
Cary & Son, W. 20th, N. Y.	32
Dunbar Bros., Bristol, Conn.	32
Coal Miners of.	
Ely E. B. & S. Co., New York.	20
Pardee A. & Co., 111 Broadway, N. Y.	20
Coal Hods.	
Griffiths Geo., Phila., Pa.	3
Codes and Splice Mills.	
Lane Brothers, Millbrook, Pa.	17
Enterprise Mfg. Co., Philadelphia, Pa.	17
Coke.	
Water Farms, 230 S. Third, Phila.	5
Compasses and Dividers, Manufacturers of.	
Hemla & Calli Hall & Tool Co., Springfield, Mass.	32
Stevens J. & Co., Chicopee Falls, Mass.	32
Copper.	
Merchant & Co., 407 Market St., Phila.	28
Pope, Cole & Co., Baltimore, Md.	2
The New Haven Copper Co., 215 Pearl, N. Y.	2
Corn Huskers.	
Chalmers, Boring & Quinlan, Decatur, Ill.	10
Corn Sheller.	
Goddard Curtis, Alliance, O.	45
Corrugated Iron.	
Moseley Iron Bridge and Roof Co., 5 Day, N. Y.	2
Corners for Cloth.	
Hubbard R., Northville, N. Y.	24
Cutlery and Cutters.	
Browning, Sloan & Co., 5 Chambers, N. Y.	24
Countersinks.	
Barber D. F., 131 Washington, Boston.	38
Crucibles.	
Seldel R. B., Philadelphia, Pa.	33
Cupolas.	
Smith & Syre Mfg. Co., 21 Cortlandt, N. Y.	17
Curry Combs.	
Lawrence Curry Comb Co., 309 East 2nd, N. Y.	11
Cutlery.	
Baker Hermann & Co., 101 Duane, N. Y.	28
Clatworthy F. & W., 32 Chambers, N. Y.	10
Friedman & Lauter, 101 Chambers, N. Y.	10
Cutlery, Manufacturers of.	
Burkshaw Aaron, Peppermint, N. Y.	10
Conway T. C., 23 Chambers, N. Y.	11
Furness, Remister & Co., Newark.	10
Greenfield Tool Co., Greenfield, Mass.	10
John Russell Cutlery Co., 40 Chambers, N. Y.	10
Mets Paul, 127 Upper Thames St., London, Eng.	10
The Wm. Rogers Mfg. Co., Hartford, Ct.	10
The Wm. Rogers Mfg. Co., 28 Chambers, N. Y.	10
De-oxidized Bronze Metals.	
Phila. Smelting Co., 12th and Noble Sts., Phila.	31
Differential Pulley Blocks.	
Tale Lock Mfg. Co., 4 Chambers, N. Y.	3
Dinner Hall and Kitchen.	
Leigh E. B. St. Louis, Mo.	24
Discount Tables.	
Leigh E. B. St. Louis, Mo.	24
Dust and Gate Springs.	
Barlett Frederick, Freeport, Ill.	32
Van Wagoner & Williams, 23 Beekman, N. Y.	32
Door Bolts.	
Ives Robert B., New Haven, Conn.	33
Drilling Machines, Makers of.	
Blackford H., Cincinnati, O.	37
Burgess Wm. & Co., Phila. & 10 Liberty St., N. Y.	37
Thorne, De Haven & Co., Philadelphia, Pa.	37
Wiley & Russell Mfg. Co., Greenfield, Mass.	37
Drop Forgings.	
Merrill C. & Sons, 55 Grand, N. Y.	38
Edge Tools.	
Doosher M., 23 Chambers, N. Y.	24
Elevators, Makers of.	
Crane Bros. Mfg. Co., Chicago, Ill.	35
Stokes & Parrish, Philadelphia, Pa.	35

Elevator Buckets.	
Rowland T. E., Brooklyn, N. Y.	4
Emery and Emery Works.	
Emery & Co., Perth Amboy, N. J.	36
Irvine A. A. & Co., 14 Murray, N. Y.	36
Lehigh Valley Emery & Abrasive Co., Easton, Pa.	36
Vitrified Wheel Co., Weymouth, Mass.	36
Engines, Gas.	
Schleicher Schumm & Co., Philadelphia, Pa.	37
Engines (Locomotive).	
Baldwin Locomotive Works, Philadelphia, Pa.	6
Engines, Steam, Makers of.	
Davis A. J. & Co., Newark, N. J.	37
Tyson Engine Co., Philadelphia, Pa.	37
Norwalk Iron Works Co., S. Norwalk, Conn.	35
Wetherill Robt. & Co., Chester, Pa.	37
Engines, Self-Measuring, Makers of.	
Enterprise Mfg. Co., Phila. and N. Y.	27
Lane Bros. Millbrook, N. Y.	12
Fencing, &c.	
Cleveland Wrought Iron Fence Wks., Cleveland, O.	7
Filing, Importers of.	
Carl J. & Eiley, 23 Gold, N. Y.	36
Filing, Manufacturers of.	
Aburn File Works, 50 Chambers, N. Y.	8
Barnett G. & H., 41 and 43 Richmond, Phila.	8
Boydton E. M., 23 Chambers, N. Y.	38
Darke & Draper, Sing Sing, N. Y.	38
Diston Henry & Sons, Philadelphia, Pa.	12
Everhart James M., Scranton, Pa.	28
Heller & Co., Newark, N. J.	8
Hiscox File Mfg. Co., Weymouth, Mass.	8
Johnson & Co., 1 Commercial, Newark, N. J.	8
Jeffrey & Bro., 172 and 174 N. 4th, Phila.	8
Nicholson File Co., Providence, R. I.	8
Paul Chas. H., Williamsburgh, N. Y.	8
Stencel J. R., Sheffield, England.	10
Union File Works, Baltimore, Md.	8
Filters.	
Crocker Filter Co., Boston, Mass.	24
The Norwalk Iron Works Co., S. Norwalk, Conn.	35
Fire Arms.	
Conway T. O., 20 Chambers, N. Y.	11
Harley & Graham, 23 Chambers, N. Y.	11
Lovell John P. & Sons, Boston, Mass.	11
Fire Brick, Makers of.	
Borghe & Co., Philadelphia, Pa.	32
Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y.	32
Gardner & Co., 23 Chambers, N. Y.	24
Hall & Sons, Buffalo, N. Y.	32
Justice Philip S., Philadelphia, Pa.	32
Kreischner & Co., 23 Chambers, N. Y.	24
Maurer Henry, 415 East 2d St., Houston, Tex.	32
Newton & Co., Albany, N. Y.	32
Perth Amboy Terra Cotta Co., Perth Amboy, N. J.	32
Valentine M. D. & Bro., Woodbridge, N. J.	32
Watson Fire Brick Co., Perth Amboy, N. J.	32
Flint and Amson Co., 730 Market, Philadelphia, Pa.	7
Forges, Portable, &c.	
Embley & Co., Buffalo, N. Y.	38
Cooke William, 6 Cortlandt, N. Y.	38
Empire Portable Forge Co., Cohoes, N. Y.	38
Holt Mfg. Co., Cleveland, Ohio.	38
Keystone Portable Forge Co., 38 Cortlandt, Phila.	38
Forgings, Iron and Steel.	
Ecceles Richard, Auburn, N. Y.	27
Rose Wm. & Bros., West Philadelphia, Pa.	27
Foundry Furnaces.	
Obermayer & Co., Cincinnati, O.	8
Paxson J. W. & Co., 51 Beech, Phila.	6
Whitehead Bros., 177 15th, N. Y.	3
Fry Pans.	
Stirling & Co., 111 Avenue A, N. Y.	27
Furnaces, Makers of.	
Richmond & Potts, 119 S. 4th, Phila., Pa.	5
Furnace Holes.	
Stokes & Parrish, Phila., Pa.	36
Furnace Shields.	
Phila. Smelting Co., 12th and Noble Sts., Phila.	31
Furniture Springs.	
Cary & Moon, 34 W. 25th, N. Y.	3
Garden Tools.	
Dunlap C. W. & Co., 41 Chambers, N. Y.	27
Glass.	
Stokes & Co., Durhamville, N. Y.	35
Grate Bars.	
Crawford David S., Philadelphia, Pa.	34
Grindstones.	
Louder & Co., Boston, Mass.	39
Wood H. S. & Co., 33 West, N. Y.	39
Wood Walter R., 235 and 245 Front, N. Y.	39
Gunpowder.	
Kneeland F. L. (Duport) 7 Wall, N. Y.	28
Laffin & Hand Powder Co., 22 Murray, N. Y.	28
Handles, Snaps &c.	
Hundley & Hanks, 79 Reade, N. Y.	31
Hangers, Run Door.	
Kidder Slide Door Hanger Co., Romeo, Mich.	27
S. H. & E. Y. Moore, Chicago, Ill.	27
Hardware Commission Merchants.	
Horace F. Sise, 10 Chambers, N. Y.	8
Abraham & Lathen, 113 Chambers, N. Y.	8
Heaton & Denckla, 57 Commerce, Phila.	21
Yates David & Co., 32 Church, N. Y.	21
Hardware Dealers.	
Lloyd, Supple & Walton, 65 Market, Phila.	31
Shedden & Co., Buffalo, N. Y.	31
Hardware Importers.	
Baker Hermann & Co., 101 Duane, N. Y.	28
McCoy & Co., 124 and 126 Duane, N. Y.	110
Hardware Manufacturers.	
Coulter, Flager & Co., 37 Chambers, N. Y.	9
Cowles Hardware Co., Unionville, Conn.	33
Enterprise Mfg. Co., Phila.	17
Globe Mfg. Co., Middletown, Conn.	7
Globe Hardware Co., 23 Chambers, N. Y.	24
Lloyd, Supple & Walton, 65 Market, Phila.	31
Millers Falls Co., 74 Chambers, N. Y.	21
Russell & Erwin, 12 Chambers, N. Y.	24
Shannon J. B. & Sons, Philadelphia, Pa.	24
Shepard Hardware Co., Buffalo, N. Y.	27
Stables & Co., New Britain, Conn.	8
Tietbout W. J. & J., 31 Chambers, N. Y.	24
Trenton Lock & Hardware Co., Trenton, N. J.	29
Thompson Mfg. Co., 23 Chambers, N. Y.	24
Van Wagoner & Williams, 23 Beekman, N. Y.	32
Hardware Specialties.	
Cleveland Wrought Iron Fence Works, Cleveland, O.	7
Plumly James, Philadelphia, Pa.	31
Davis Wm. L., Chelsea, Mass.	31
Philadelphia Novelty Mfg. Co., Philadelphia, Pa.	12
Shepard & Co., 23 Chambers, N. Y.	24
Seneca & Underhill, 43 Chambers, N. Y.	24
Sprague Novelty Works, Rochester, N. Y.	24
Winger, R. B., Freeport, Ill.	24
Harness Snaps.	
Covert Mfg. Co., West Troy, N. Y.	24
Haws Knives.	
Kimberlin R. P. & Co., Indianapolis, Ind.	24
Hay Forks.	
Hoy Hiram & Co., East Wilton, Me.	24
Hel Buffers.	
Lyons Nelson, Albany, N. Y.	29
Hinges.	
Hawley Hdw. Co., Unionville, Ct.	33
Seavill Mfg. Co., 415 Chambers, N. Y.	24
Stanley Works, New Britain, Conn.	8
Hog Rings.	
Chalmers, Boring & Quinlan, Decatur, Ill.	10
Holding Engines, Makers of.	
Frane Bros. Mfg. Co., Cleveland, Ill.	35
The Norwalk Iron Works Co., S. Norwalk, Conn.	35
Holding Machines.	
202 Alfred & Co., Green, Phila.	37
Cincinnati Chain Bolt Co., Cincinnati, O.	37
Harrington Edwin & Son, Philadelphia, Pa.	37
Sellers Wm. & Co., Phila. & 10 Liberty St., N. Y.	37
Stokes & Parrish, Phila., Pa.	36
Hooks (Cotton & Bale).	
New York Handle & Mallet Works, 45 E. Houston, N. Y.	13
Hook Clips.	
Baker Hermann & Co., 101 Duane, N. Y.	28
Shannon J. J., Philadelphia, Pa.	28
Horse Hay Fork.	24
Waldron John, Muncy, Pa.	24
Horse Nails, Makers of.	
Amable Horse Nail Co., 4 Warren, N. Y.	25
Bridgeport Brass Co., 23 Chambers, N. Y.	24
EP Nail Co., Cleveland, O.	25
National Horse Nail Co., Vergennes, Vt.	25
Saracoe Horse Nail Co., Pittsburg, N. Y.	25
Horse Shoes, Makers of.	
Burdien Iron Works, Troy, N. Y.	5
Russell A., 4 Warren, N. Y.	2

all the iron ore required by the South Branch rolling mills and blast furnaces during the next five years, at \$1 per gross ton.

Detroit's new pin factory is already a pronounced success.

Adams' foundry and machine shop, at Marshall, Mich., valued at \$20,000 and insured at \$4,000, was destroyed by fire last week.

The Edwards Manufacturing Company, of Detroit, have filed articles of association with the Secretary of State and County Clerk. They will engage in the manufacture of door springs and spring butts. Capital stock, \$10,000. The company meet in a few days for the election of officers. A. K. Edwards, who is well known to the hardware trade of the State, will be superintendent of the works.

TENNESSEE.

The Chattanooga Saw Works are running regularly on orders, and have a most promising outlook for the future.

Lookout Rolling Mill is running double turn, and promises a heavier business the ensuing year than ever before.

The Enterprise Machine Works, Chattanooga, are busy on contracts for engines and pumps and in meeting the demands for jobbing.

Chattanooga Furnace is turning out an average of 32 tons of pig per day.

The zinc works at Clinton have been put in operation, and are said to be producing a good article.

ALABAMA.

Alabama Furnace (charcoal) was to blow out on January 1, with the intention of staying out until April 1.

Bibb furnaces are still out of blast, but expect to put on the blast and start early in February.

Tecumseh Furnace has now been in continuous blast for five and a half years, and has made on one hearth 27,500 tons, with the furnace still doing well.

Gandy's Patent Cotton Belting.—The strength of American cotton in the shape of hose or belting is well known. Its use in combination with rubber has shown of what it is capable in the way of withstanding ordinary strains, while in the shape of hydraulic and fire hose it has successfully done work utterly beyond the reach of leather. We have just had put into our hands a sample of belting which, at first glance, appears like leather. It is, however, an altogether different substance, and consists of a wide web of cotton duck or canvas, folded until it has the proper width, and then sewn from end to end in parallel lines. The stitches are, in a 3-inch belt, rather more than 1/4-inch long, and the lines are about 1/4-inch apart. There are 11 in the width of the belt. The sewing is done with sail or shoemakers' thread, and is what is known as the lock-stitch. A flexible and water-proof paint covers the whole and gives it the appearance of leather. These belts are made by the Gandy Belting Company, of 15 Hollingworth street, Baltimore, Md. They are made in 4, 6, 8 and 10-ply, and from 1 1/2 up to 60 inches in width. It is stated that a 6-inch 8-ply belt of this kind, which costs only 60 cents per foot, showed a tensile strength of more than 11,700 pounds in one of Kirkaldy's tests, while double leather belts averaged from 6000 to 7000 pounds. Belts of this kind can be used in all situations where ordinary leather belts are employed, and it is claimed are vastly superior in all respects. One of the advantages is that they can be obtained of any desired length without joints. When necessary, they can be jointed in the usual manner with laces or by riveting.

The experiments which have been made in France with a view to the substitution of printing types made of toughened glass in place of those of metal, have proved quite encouraging. The advantages in point of cleanliness would, it is alleged, be considerable. The toughened glass is naturally much harder than the usual metallic composition, and can hardly be crushed out of shape by those small accidents which shorten the life and mar the beauty of the type now employed. The glass, too, is capable of being cast into more delicate shapes, so that the difference between the thin and the thick strokes can be more clearly defined.

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Boiler and Tank Plates, Merchant Sheets, Nail Sheets, Nail Strips, &c.

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Globe Iron Works, Stalybridge, England.

THE PATENT SCREW WINDOW BALANCE.

With which the Sashes work as with weights, their application being at an expense of one-half the cost of applied weights, no boxings being required. The Sashes are Locked with the meeting rail lock. Stands alone in its working. Price \$1 per set (four). Discount to the trade. In use over three years. Robt. B. Huguenin, Sole Maker, Hartford, Ct., U. S. A.

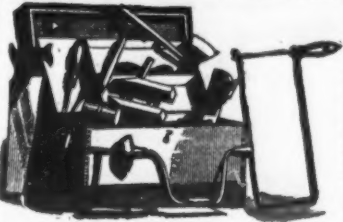
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Burlington, Vt.

A WORD OF CAUTION.

The fact that the great demand for my Patent Eureka

Sap Spouts was driving the sale of all other

kind out of the market and out of use has influenced

some lawless persons to imitate, by unlawfully using

my patents. I therefore warn all such persons and

the public generally against the manufacture, sale,

and use of a sap spout with its inner end provided

with longitudinal edges, fins or flanges, whereby the

spout is secured to the surface of the tap or bore, and

between the same are chambers for the free flow of

sap without obstruction, from the entire length of the

bore. A sap spout with its inner end provided with

a chamber of smaller dimensions around its neck, for

the free flow of sap between the outer packing and

inner bearing; a wire bucket, hanger, detachable, or

one permanently attached to, or one cast integral

with, a sap spout; a sap spout with its extreme

outer end provided with a drop-clip, or rib on its

underside for facilitating the quick discharge of sap

from out the spout into the bucket—all these are

some of the essential points patented or owned by

me, and their infringement by manufacture, sale or

use will receive the full penalties of the law. Suits

for damages have already been brought against

leading infringers, and others may be expected to

follow unless voluntarily settled.

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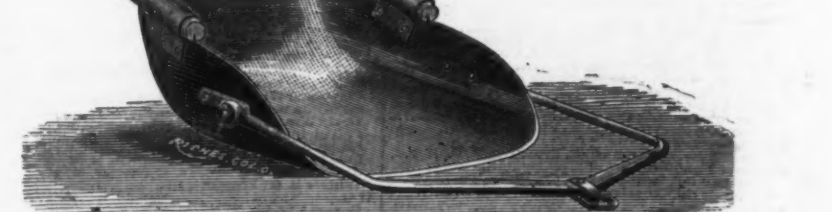
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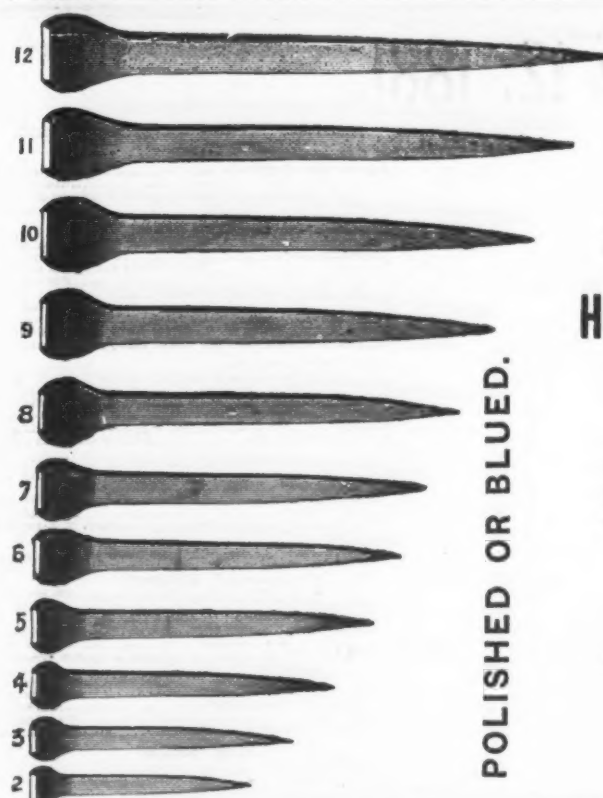
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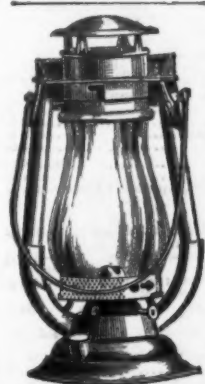
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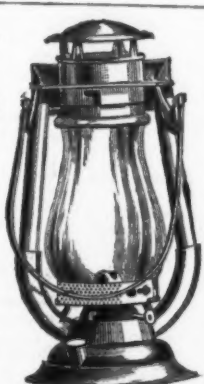
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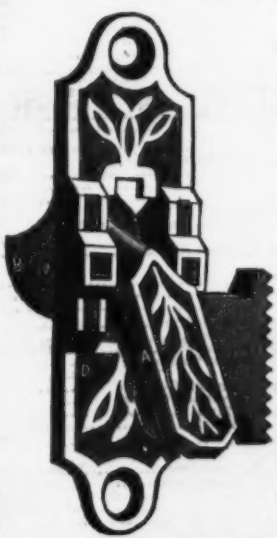
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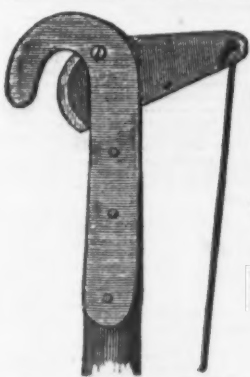
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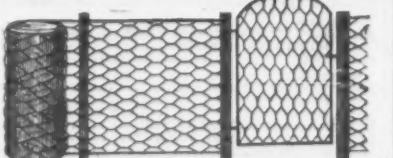
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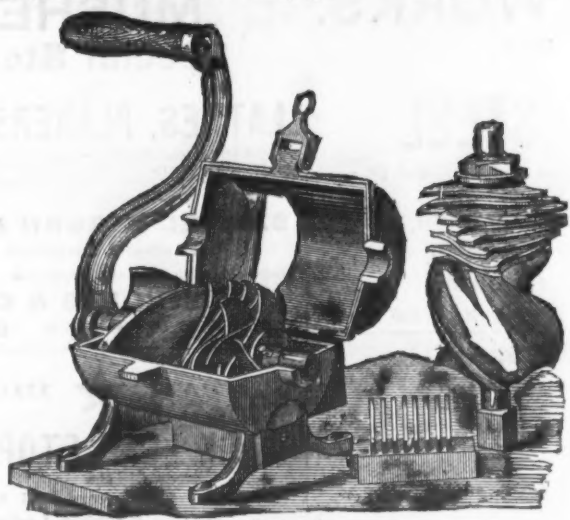
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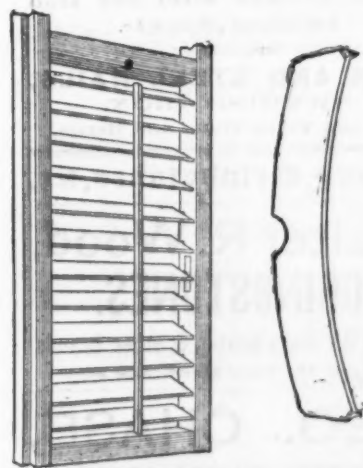
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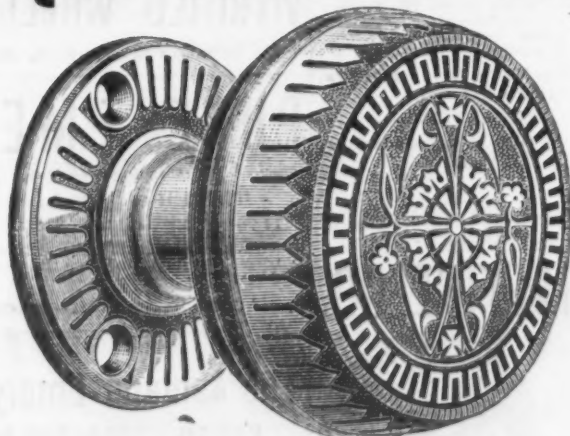
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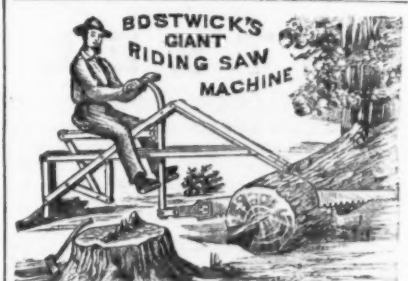
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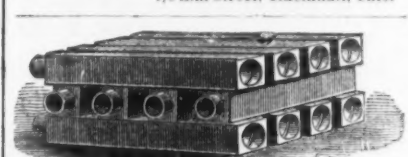
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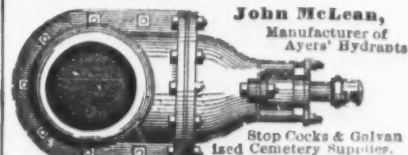
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See Page 2.

Steel.

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And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

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Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS, TABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for CLOCK SPRINGS, CORSET CLASPS, &c.

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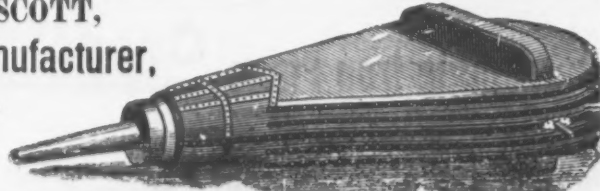
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Turns out at least double work by increased speed and less wear on tools than any other Steel. Neither hardening nor tempering required.

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BLACK LEAD STOPPERS,

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All the regular sizes in stock, with Nozzles to fit each size. Special sizes or shapes made to order from sample or drawing.

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Of all description.

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THE VITRIFIED
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The only one made on scientific principles. It runs dry, in water, or in oil. Can be made hard enough for the hardest work, and soft enough for the most delicate tools. It holds less than any other wheel. It will cut Iron, Steel, Brass, Silver, Copper, Marble, Granite and Wood; also, Rubber, Paper and Iron Rails. Address

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The Finest Turkish Ore

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Consumers will find it to their interest to apply direct to our mills and save the commissions of middlemen.

Assorted Sizes Always on Hand.

Quality, grades and prompt execution of orders guaranteed. Address

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GRINDSTONES,

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Stones for Machinists, Carpenters, Farmers and

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TURKISH EMERY

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Send for quotations and samples.

Steel.

THE EDGAR THOMSON STEEL CO., LIMITED.

MANUFACTURERS OF



General Office and Works at Bessemer Station (Penn. R. R.), Allegheny County, Pa.

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The Company warrants its rails equal in quality to any manufactured in the United States.

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ESTABLISHED 1859.

CAPITAL \$3,000,000.

INCORPORATED 1869.

Works at Chicago, Ill., and Milwaukee, Wis.

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MERCHANT BAR, FISH PLATES, PIG METAL,
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Fish Plates.....	30,000 tons
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Total Capacity per year.....	280,000 "

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NOTICE.

Hereafter our GALVANIZED
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adapted these

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to protect ourselves and the trade
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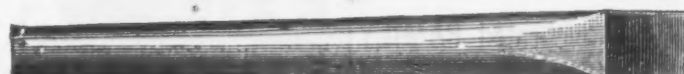
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Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.

DEOXIDIZED BRONZE.

Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.

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Very truly,
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French Points,

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Roofing Nails,

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Veneer Nails, Label Tacks and small Nails of all kinds, Cabinet Nails, Barbed Lock Nails, Cigar Box Nails, &c., &c., put up in bulk, 5 lb. packages, 1 b. papers, or as wanted.

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COVINGTON, KY.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

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OFFICE: 44a CANNON STREET, LONDON, E. C.

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THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in this *Ironmonger* and *Foreign Supplement* is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

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BEST AND CHEAPEST.
Established 1845.
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FIRE BRICK
Stove Linings,
Range and Heater Linings
Cylinder Brick, &c., &c.

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Manufacturers of
FIRE BRICK
And Furnace Blocks
DRAIN PIPE & LAND TILE.
Woodbridge, - - - N. J.

BORGNER & O'BRIEN,
Manufacturers
FIRE BRICK
AND
Edge Pressed Furnace Blocks,
CLAY RETORTS, TILES, &c.,
Twenty-third Street,
Above Race, PHILADELPHIA.
Twenty years' practical Experience.

PERTH AMBOY TERRA COTTA CO.,
Successors to
A. HALL & SONS, Perth Amboy, N. J.,
ARCHITECTURAL TERRA COTTA
AND
FIRE BRICK.
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Clay Retort and Fire Brick Works,
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Manufacturers of Clay Retorts, Fire Brick,
Gas House and other Tile.
VAN DYKE, EL ZABETH, RICHARDS & PARTITION STS.
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ESTABLISHED 1856.
Successors to JOHN R. WATSON, Perth Amboy, New Jersey.
Manufacturers of

FIRE BRICK,
For Rolling Mills, Blast Furnaces, Foundries,
Gas Works, Lime Kilns, Tanneries, Boiler
and Grate Setting, Glass Works, &c.
Fire Clays, Fire Sand, and Kaolin for Sale.

HENRY MAURER,
Proprietor of the
Excelsior Fire Brick & Clay
Retort Works,
Manufacturer of FIRE BRICK, HOLLOW
BRICK AND CLAY RETORTS.
WORKS: PERTH AMBOY, NEW JERSEY.
Office & Depot, 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS,
Troy, N. Y.,
JAMES OSTRANDER & SON,
ESTABLISHED 1848,
Manufacturers of
FIRE BRICK,
Tuyeres, Tiles, Blast Furnace Blocks, &c. Miners and
Dredgers in Woodbridge Fire Clay and Sand, and Station
Island Kaolin.

Established 1864.
GARDNER BROTHERS,
Manufacturers of
STANDARD SAVAGE FIRE BRICK,
TILE & FURNACE BLOCKS,
OF ALL SHAPES AND SIZES.
Clay Gas Retorts and Retort Settings, and
Miners and Shippers of Fire Clay.
Office: 146 Smithfield St., Pittsburgh, Pa.
Works: Mt. Savage Junction, Md., and Lockport, Pa.

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FIRE BRICK,
Buffalo, N. Y.
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SHIP CHANDLERY,
103 R-ade Street, New York.
Manufacturers of and Wholesale Dealers in
Cotton and "Long Flax" Sail Duck,
Cotton and Linen Ravens,
Creed's Patent Ships' Clews, Beltman's Wire Rope
Squeezers, Agent for Raymond's American Crane Oil
for lubricating Cylinders and Valves.

Mellert Foundry & Machine Co.,
Limited.
(Works Established at Reading, Pa., in 1848)
Manufacturers of
CAST-IRON WATER & GAS PIPE
Specials, Flange Pipe, Retorts, Valves and Hydrant
Lump Pumps, &c. The Improved Canadian Tur-
bine Water Wheel, Machinery and Castings
for Furnaces, Rolling Mills, Grist and Saw Mills, Min-
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Railings, &c.
ARNOLD MELLERT, Supt., Reading, Pa.

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA.

The cut shown herewith represents our

STAR SAW SET,

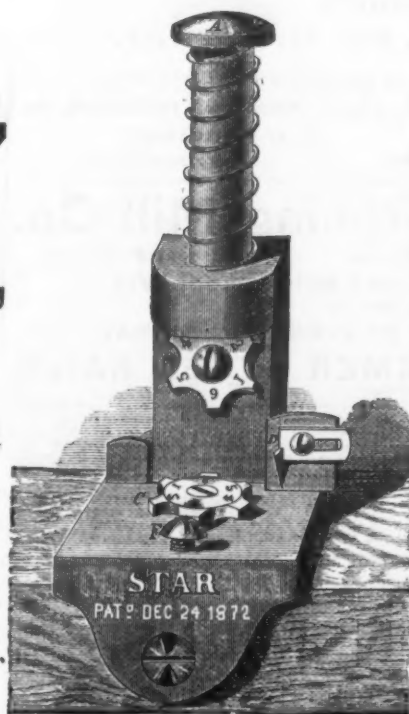
which is unequalled for simplicity, durability and accuracy in

Setting all kinds of Hand Saws, Web Saws,
Wood Saws, Back Saws.

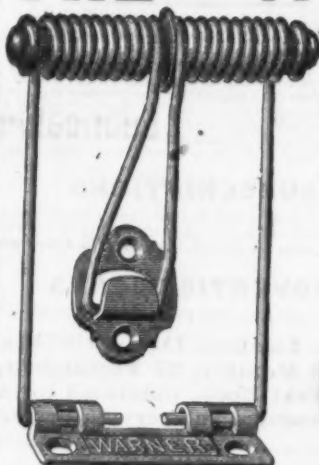
We guarantee this tool to do the work for which it is in-
tended, if properly used; if it does not, the money will be re-
funded and the tool can be returned at our expense.

We have long felt the need of a Saw Set that would set
the teeth of a saw without breaking, and at the same time can
be worked by anybody.

In the Star Set the same principle is involved as is used in
our works for setting saws.



THE "WARNER" DOOR SPRINGS



are the most simple, most effective and most convenient ever introduced, and the immense sale we
are having shows their great popularity and superiority.

There never was a Spring made that is so durable, so complete in its action, operating with a
uniform pressure, holding the door tight when closed, and allowing it to open without increasing
the pressure at any point.

When the door is opened about 130 degrees of a circle, it will press and hold it open.

The Spring is easily unhooked and rehooked—in an instant—from the door and also
from the jamb, without removing a screw or pin.

This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:

No. 1 For Screen or Light Storm Doors.

No. 2 For Medium Doors.

No. 3 For Heavy Doors.

They are for sale by most of the prominent jobbers of the United States and Canada.

Correspondence solicited.

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FREEPORT, ILLINOIS.

CHAMPION ONE-MAN SAW



WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw.
We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.



NEW MAKE OF MINE LAMP.
THREE DIFFERENT SIZES
SEND 15 CENTS FOR SAMPLE TO
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THE TURNER & SEYMOUR MFG. CO.,
WOLCOTTVILLE, CONN.,
Manufacturers of

The "AMERICAN" and CLIPPER SHEARS, Celebrated FAMILY
EGG BEATER, JUDD'S and other SHADE FIXTURES, PIC-
TURE NAILS, and a large line of UPHOLSTERERS' and
FANCY HARDWARE and METAL NOTIONS.



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We desire to call special attention to our line of
**Nickel Plated Nut Picks, Nut
Crackers and Fruit Knives.**

They are fine in appearance, durable and very
cheap. They are put up in sets in handsome imi-
tation Morocco boxes, or any of the articles alone
in common boxes.

We also have a fine line of

Nickel Plated Scissors,
and many other goods suitable for Holiday trade.
Price Lists and discounts furnished the trade on
application.

John T. Lewis & Bros.
No. 231 South Front St.,
PHILADELPHIA.



Pure White Lead, Red Lead, Litharge,
Orange Mineral, Linseed Oil,
AND PAINTERS' COLORS.

Brooklyn White Lead Co.



White Lead, Red Lead & Litharge.
No. 182 Front Street,
NEW YORK.

JOHN JEWETT & SONS,
Manufacturers of the well-known brand of
WHITE LEAD.



ALSO MANUFACTURERS OF
LINSEED OIL.
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**The Atlantic White Lead
and Linseed Oil Co.,**
MANUFACTURERS OF
**White Lead (Atlantic), Red Lead,
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287 Pearl Street, New York.



DUNBAR BROS.,
Manufacturers of
Clock Springs and Small Springs
of every description, from best Cast Steel
BRISTOL, CONN.

"VALENTINE'S" PATENT FELT WEATHER STRIP.

For keeping out Cold, Wind and Dust. The best,
most durable and cheapest Strip in the market. It is
not affected by the weather, does not become hard
and brittle in cold or melt in warm weather. Sam-
ples and Price Lists sent free by mail.

W. T. VALENTINE,
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THOMAS MORTON,
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SASH CHAINS.
With Patent Attachments.
Warranted for years. Chains of any size made to
order, and trade supplied with liberal discount.

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Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

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Peter Wright, 7th St. 10940

Over 25 lbs. 110

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Keystone Centennial, 1876 4.25

Reading No. 72 1.00

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Over 25 lbs. 110

Eagle (American) 100 lb 110

Apple Parers.

Keystone Centennial, 1876 4.25

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No. 74 1.00

No. 75 1.00

No. 76 1.00

No. 77 1.00

No. 78 1.00

No. 79 1.00

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No. 149 1.00

No. 150 1.00

No. 151 1.00

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Eagle (American) 100 lb 110

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No. 74 1.00

No. 75 1.00

No. 76 1.00

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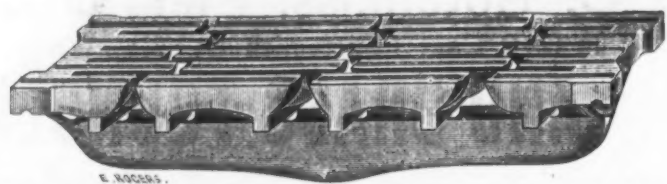
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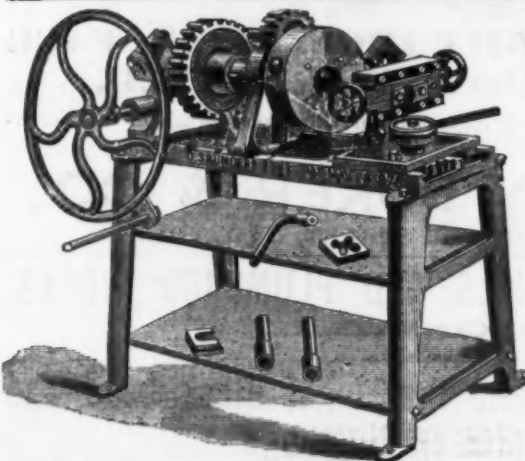
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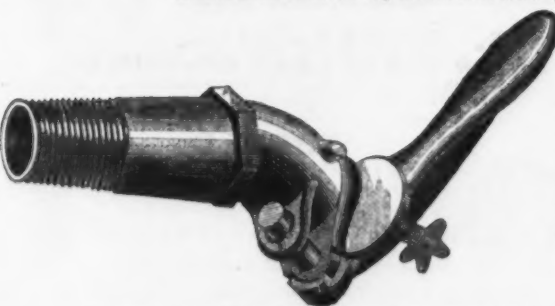
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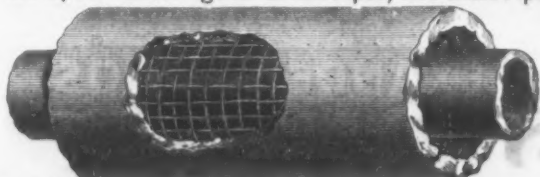
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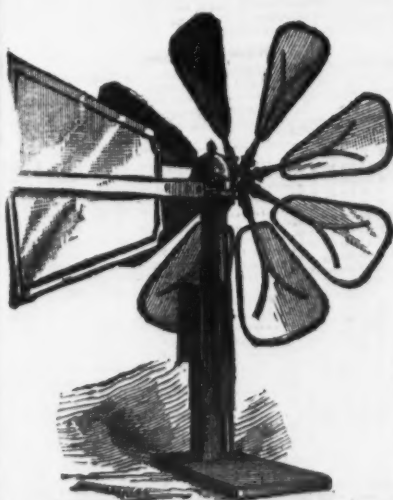
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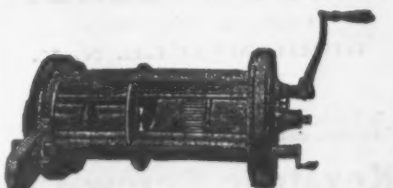
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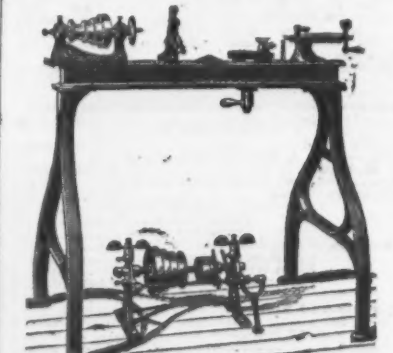
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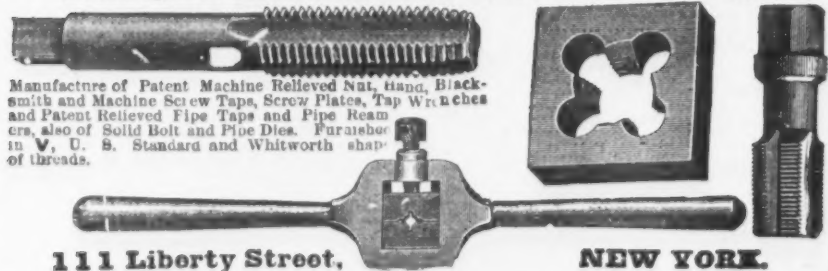
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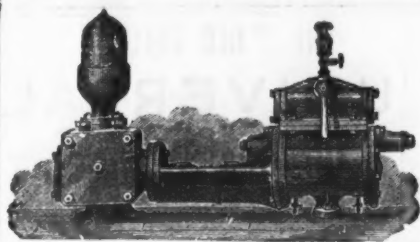
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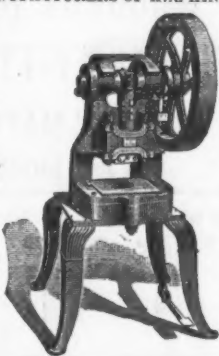


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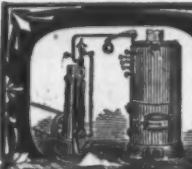
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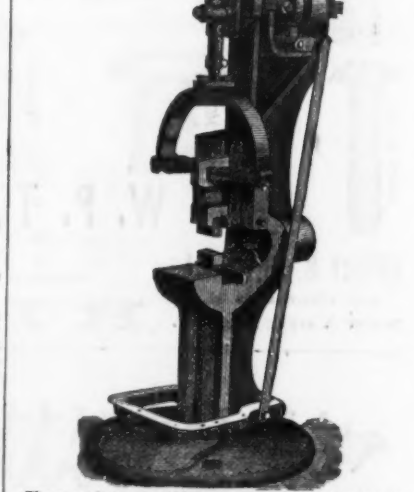
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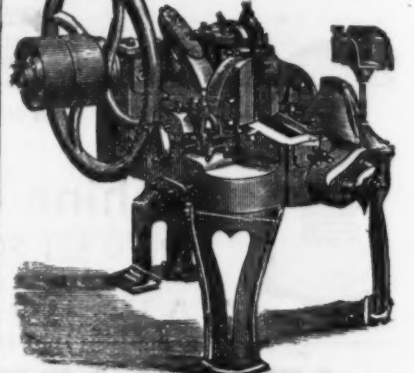


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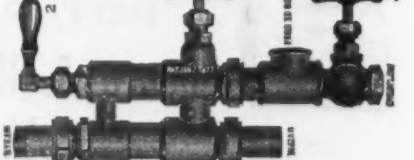
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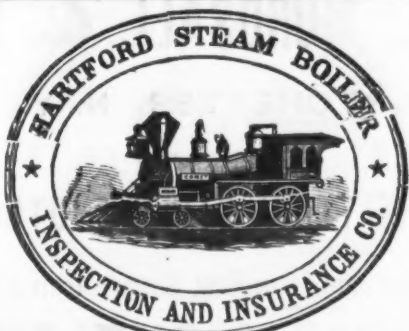
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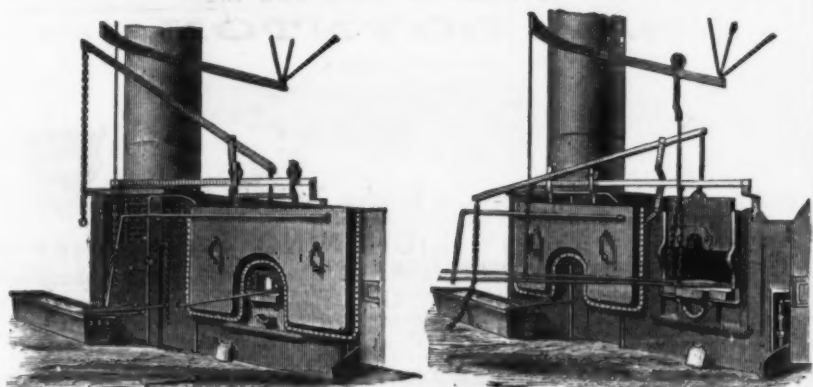
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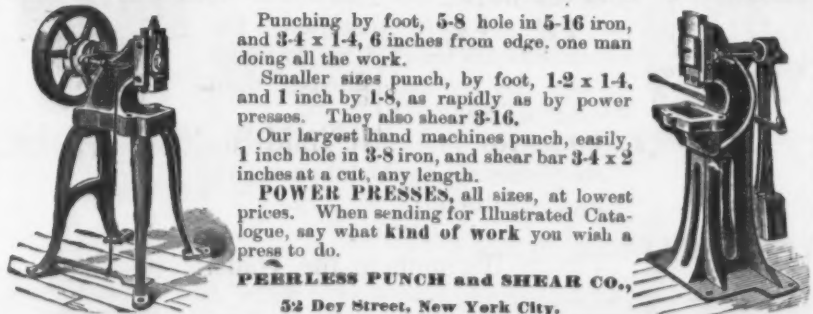
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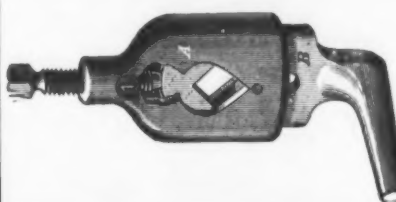
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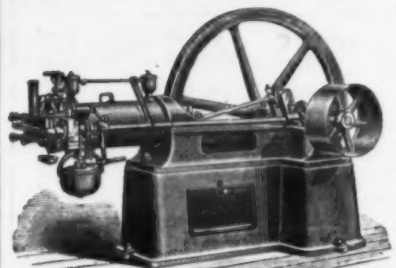
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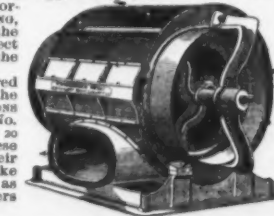
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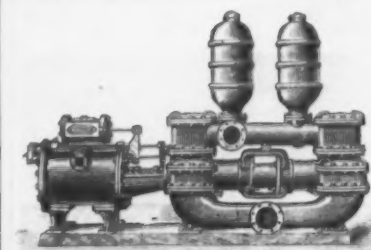
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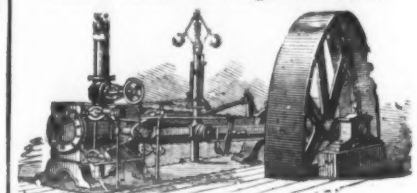
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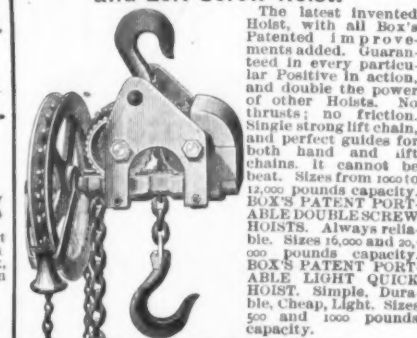
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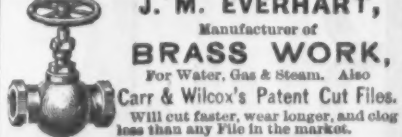
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